U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

# REPORT

OF THE

# UNITED STATES COMMISSIONER OF FISHERIES

FOR THE FISCAL YEAR 1936

WITH

# APPENDIXES

FRANK T. BELL
COMMISSIONER

UNITED STATES
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## NOTE

The first section of this volume, entitled "Bureau of Fisheries," constitutes what was known in years prior to 1933 as "Report of the Commissioner of Fisheries." Since then, in the interests of economy, it is a reprint from the "Annual Report of the Secretary of Commerce." The pagination, therefore, is the same as that of the Secretary's Report, rather than beginning with page 1.

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# U. S. DEPARTMENT OF COMMERCE

## BUREAU OF FISHERIES

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MARINE BIOLOGICAL LABORATORY WOODS HOLE MASS.

[Reprinted from the Annual Report of the Secretary of Commerce, 1936]

# BUREAU OF FISHERIES

Available statistics indicate greater activity in the fisheries and fishery industries during the calendar year 1935 than in any of the several immediately preceding years. This was not only true in the case of processed fishery products but also was evident in the markets for fresh and frozen (including packaged) fish. Average prices for the year advanced for some commodities; such advances were usually small and frequently prices were lower than in the preceding year. However, the industry appeared to be adjusting itself to existing price levels and to be in a generally healthier condition than for several years.

The domestic commercial fisheries are conducted on the high seas as well as in coastal waters and interior lakes and streams. Based upon available statistics for the calendar year 1934, when the most recent detailed catch surveys were made, there was a large increase in the catch as compared with the preceding calendar year. Statistics of the catch were collected for both 1933 and 1934 in the Chesapeake, Pacific, and Lake States, and in Alaska. When considering the combined catch in these sections alone, an increase of 50 percent in the volume and 33 percent in the value of the catch was indicated. While these increases were reflected in each of the four geographical sections and in many species, they were especially important in increased catches of pilchard, mackerel, and tuna and tunalike fishes in California.

Based on the most recent surveys, our commercial fisheries gave employment to about 123,000 fishermen, whose catch amounted to 3,950,779,000 pounds, valued at $74,163,000. The output of canned fishery products in 1934 amounted to 700,157,000 pounds, valued at $80,021,000, representing an increase of 31 percent in volume and 34 percent in value as compared with 1933; the output of byproducts was valued at $22,608,000, representing an increase of 29 percent; and the production of frozen fishery products, excluding packaged products, amounted to 97,290,000 pounds, estimated to be valued at $8,500,000.

Based upon the most recent surveys, the production of fresh and frozen packaged fish and shellfish amounted to 150,593,000 pounds, valued at $20,678,000; and cured fish, 98,141,000 pounds, valued at $13,047,000. It is estimated that about 650,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about $52,000,000, were marketed during 1934. Thus, the total marketed value of all fishery products to domestic primary handlers in 1934 reached nearly $200,000,000.

Imports of fishery products for consumption during the calendar year 1934 were valued at $30,790,000, which is 1 percent more than in 1933, while exports were valued at $13,822,000, or 66 percent more than in the previous year.

## FISHERY ADVISORY COMMITTEE

During the past fiscal year the Fishery Advisory Committee for the Secretary of Commerce held meetings in the Commerce Department Building, Washington, D. C., on October 21 and 22, 1935, and January 13 and 14, 1936. These were under the chairmanship of E. B. McGovern, vice Bernarr Macfadden, resigned.

Both of the meetings were well attended by the members of the committee and others, who have been appointed from various branches of the fishery industry and related interests, including science, medicine, and transportation. The purpose of the committee is to give detailed consideration to the problems of the industry from a mutual standpoint and to offer recommendations for the promotion and development of the general welfare of the fishery industry.

The committee was especially active in promoting desirable Federal legislation to aid the industry along the line of market and economic research, and in conservation, and trade-practice matters. The work of the committee undoubtedly was largely instrumental in having Congress ratify the sockeye-salmon treaty with Canada which has been pending for several years, and which gives promise of restoring to former abundance the great sockeye-salmon fishery in the waters contiguous to the State of Washington and British Columbia.

## PROTECTION OF SALMON IN THE COLUMBIA RIVER

The Columbia River supports one of the most important salmon fisheries on the Pacific coast. Owing to the intensive fishing near the mouth of the river and in adjacent areas at sea, the increase of agriculture and forestry, and the impending industrial development of the region, these valuable fisheries are being menaced by new conditions inimical to natural propagation of the fish. Hence the preservation of the fishery depends upon careful management, and the coordination of various demands on the Columbia waters to adjust the conflicting requirements. Complete management of the Columbia River fisheries includes (1) the regulation of the commercial fishery to permit adequate escapement of spawning fish, (2) the assurance of free access to their natural spawning areas, (3) the rehabitation by natural or artificial propagation or transplantation of formerly productive spawning areas, (4) the exclusion of pollution from nursery areas, and (5) the assurance of free return of the young to the sea without loss from irrigation works or hydroelectric plants.

A comprehensive investigation of these various fields, started 2 years ago, involves a statistical study of the annual and seasonal fluctuation in the abundance of the important species of fish contributing to the commercial fisheries. Records since 1897 have been made available through the cooperation of the commercial fishery interests on the river, and these have been tabulated and partially analyzed during the year to provide evidence of suspected depletion of certain elements of the fish population.

A comprehensive program of stream survey has been continued, contributing information on (1) the total area of present and past spawning grounds in each tributary, (2) the location of areas now available, (3) the location of former spawning areas now destroyed

or rendered inaccessible, (4) the sources of pollution, (5) the number and location of irrigation canals and their effect on migratory fishes, (6) the location of natural and artificial obstructions and their effect as barriers to upstream migration, and (7) the general status of the salmon populations in the river system. Most of the tributaries of the Columbia River in eastern Washington and a few in the lower section have been surveyed during the year, totaling 1,100 miles of tributary streams.

In order to gage the size of populations of salmon that must be artificially propagated after their migration is finally barred by the Grand Coulee Dam, counting weirs have been established in two of the tributaries below the dam and observers have been stationed at the Rock Island Dam to count the fish passing these points. Through these studies it has become apparent that the two fish ladders at the Rock Island Dam are inadequate to provide free passageway without serious delay, and hence, on recommendation of the Bureau of Fisheries, a third fish ladder has been constructed in time to care for the summer migrants of 1936.

As a part of the entire program for the protection of the Columbia River salmon, but conducted as a separate project, the Bureau has been engaged for over 2 years in an intensive study of the requirements of fish protection at the Bonneville Dam on the lower Columbia River, working in cooperation with the United States engineers and the State fish and game departments. Detailed designs of fish protection works, embodying an improved type of gravity fish ladder and hydraulic lifts or locks, have been prepared and formal recommendations were submitted to the War Department in August 1934. After prolonged consideration, the War Department approved the plan for fishways that for the greater part followed the recommendations of the Bureau.

During the fiscal year just closed, in addition to completing detailed designs outlined in the general plan and rendering expert advice and supervision during their construction, the Bureau's staff has been mainly concerned with devising temporary fishways to afford free passage to migrating salmon during the period of construction of the main dam and powerhouse. In the course of this work many difficulties arose from unusual flood stages of the river, and plans have been altered frequently and temporarily expedients adopted. In general, however, adequate protection has been afforded the runs of migrating fish during the spring months, and more elaborate protective measures have been adopted by the United States engineers.

## SOCKEYE-SALMON TREATY

After almost 40 years of consideration and discussion, a treaty for the protection of the sockeye salmon of Fraser River was ratified by the United States Senate on June 15, 1936, with certain reservations which are believed to be acceptable to Canadian interests. This treaty, signed in 1930 and ratified by Canada in the same year, provides for an international fisheries commission of six members, three on the part of the United States and three on the part of Canada. The commission is charged with the duty of making extensive investigations of the natural history of sockeye-salmon runs to Fraser

River and is granted authority to regulate the salmon fisheries in international and territorial waters through which Fraser River sockeye salmon pass on their spawning migration.

Although the reservations to this treaty completely nullify the regulatory authority of the commission for a period of 8 years, during which time scientific investigations shall be conducted, it is felt that a forward step has been taken to protect this resource, which has declined rapidly since 1913.

## CONSTRUCTION ACTIVITIES

New construction during the year has been confined almost entirely to fish-cultural stations. During the early part of the year, the Works Progress Administration allotted funds for construction of new fish-cultural substations at Uvalde, Tex.; Santa Rosa, N. Mex.; and Smokemont, N. C., in the Great Smoky Mountain National Park. Active construction was initiated in November and the New Mexico project was completed by the close of the fiscal year. In North Carolina, the new hatchery was placed on a producing basis, but was not fully completed. In Texas, work progressed very favorably but much remained to be done at the end of the fiscal year.

In addition, the Bureau supervised the construction of hatchery facilities where the work was being performed by other agencies, with the intent of having the operation taken over by the Bureau upon completion. Such projects were located at Walhalla, S. C., under sponsorship of the Forest Service, at Norris Dam, in cooperation with T. V. A. authorities, and at Hoffman, N. C., the site of a Resettlement Administration project. The last two units were nearly ready for operation at the close of the fiscal year. In addition to this, local W. P. A. agencies sponsored projects comprising the enlargement and improvement of several of the Bureau's hatcheries, including those at Rochester, Ind.; Natchitoches, La.; and Lake Mills, Wis.; and in the Upper Mississippi Wild Life and Fish Refuge.

Development work also continued at the York Pond, New Hampshire, brook trout station, labor and materials being furnished by the Emergency Conservation organization and the W. P. A. Minor improvements were effected at the Lamar, Pa., hatchery through the assignment of C. C. C. workers.

Comparatively little maintenance or improvement work could be performed under the regular appropriations, since it was necessary to devote these funds to the production of fish.

## CONSERVATION OF WHALES

An act, to give effect to the Multilateral Convention for the Regulation of Whaling concluded at Geneva, September 24, 1931, signed on the part of the United States March 31, 1932, and which became effective January 16, 1935, was approved by the President on May 1, 1936. The administration of the act rests jointly with the Secretary of Treasury and the Secretary of Commerce, each of whom is charged with specific duties. Enforcement matters in general are to be carried on by the Coast Guard and Customs Service of the Treasury Department, and the licensing features and collection of statistical and biological data are to be performed by the Bureau of Fisheries of the Department of Commerce.

The whale fisheries by United States vessels are prosecuted mainly off the coasts of Alaska and California, with one vessel from New York conducting operations off the coast of Australia.

## EXHIBITS AT EXPOSITIONS

During the past fiscal year the Bureau displayed exhibits depicting its activities at expositions in San Diego, Calif., Dallas, Tex., and Cleveland, Ohio. The main feature of the exhibits at the first two expositions included a painted background of an outdoor scene. The foreground consisted of rocks, bushes, and plants grouped around a pool of water stocked with warm-water fishes such as bass and bream. The main feature at the Cleveland Exposition was a mechanical diorama depicting the effect of thermal conditions in Lake Erie on the prosecution of the commercial fishery. These exhibits were financed by a portion of the special allotment granted to Federal agencies by Congress for participation in the expositions.

## COOPERATION WITH STATE AND EDUCATIONAL INSTITUTIONS

In the conduct of its statistical research work, some form of cooperation is given the Bureau in almost every State where commercial fishing is prosecuted. This cooperation on statistical work has probably reached its greatest development in the Lake States, the Pacific Coast States, and in Maryland and Virginia.

In the technological work of the Bureau many State agencies have cooperated in placing at the Bureau's disposal their facilities and members of their scientific staffs for the conduct of these investigations. Among the institutions cooperating in this work are the State Medical College, Charleston, S. C.; Massachusetts State College, Amherst, Mass.; Massachusetts State Department of Agriculture, Boston, Mass.; George Washington University, Washington, D. C.; Cornell University, Ithaca, N. Y.; Washington State College, Pullman, Wash.; University of Washington, Seattle, Wash.; University of Maryland, and the Maryland State Agricultural Experiment Station, College Park, Md.; and Western Maryland College, Westminster, Md.

There are numerous informal agreements and arrangements in effect whereby the Bureau and the States cooperate in the operation of hatcheries, distribution of fish and related fields. Such an agreement covers the work at the York pond, New Hampshire station, located in the White Mountain National Forest, and also at the Bureau's Put in Bay, Ohio, hatchery.

The Bureau's White Sulphur Springs, W. Va., station has continued to be a source of raw material in the form of trout fry which are transferred to the State rearing projects.

Indiana and Ohio have again depended upon the Bureau for the limited number of trout required for the waters of those States. In the West, much of the cooperation is connected with the collection of trout eggs.

Review of Federal applications by State authorities and coordination of distribution is now such a routine matter as to require no special comment.

Field studies on fishing and stream conditions have been conducted in a number of widely separated localities. In New Hampshire the

legislature has established a series of test streams in which experimental plantings of various species of trout have been made and a careful check of the results of these plants has been obtained through a system of anglers' reports. A similar test stream has been under observation in Virginia to determine the production of rainbow trout in relation to the number of fish planted and the abundance of natural food. In California studies of a number of streams and lakes in the high Sierras and in the coastal region have been conducted in cooperation with the State authorities. Particular attention has been given to the management of runs of steelhead trout in coastal streams and to the proper stocking and management of mountain streams. Efforts have been directed toward the stocking of more heavily fished waters with fish larger than those commonly used, and a strain of nonmigratory rainbow trout is being developed at the experimental hatchery.

## COOPERATION WITH OTHER FEDERAL AGENCIES

Various members of the technological, economic, and statistical staffs of the Bureau have assisted other Federal agencies where the work or studies of such agencies required information or advice concerning the fishery industry. The Bureau also has continued the collection of statistics of cold-storage holdings of fish in cooperation with the Bureau of Agricultural Economics, Department of Agriculture; the collection of data on landings at the Municipal Fish Wharf and Market in Washington, D. C., in cooperation with the District health authorities; and the collection of statistics on the quarterly production and holdings of fish oils for the Bureau of the Census. Studies were conducted in cooperation with the Bureau of Chemistry and Soils and the Food and Drug Administration, in connection with the development of standards for halibut-liver oil as required in the administration of the Federal Food and Drug Act.

Excellent cooperative relations have been maintained with Federal agencies concerned with the administration of wildlife or of areas supporting wildlife.

The Bureau has assisted the Tennessee Valley Authority in working out a general program of fisheries conservation and specifically has supervised the construction of a small hatchery at Norris Dam, supplementing this by allotting a number of consignments of fish from the Marion, Ala., hatchery.

The Resettlement Administration has constructed a first-class small hatchery at its Hoffman, N. C., project, and operating responsibility was being assumed by the Bureau at the close of the year.

Even closer contact has been developed with the Forest Service, and there has been an expansion in the number of fish-rearing units in national-forest holdings. Plans have been developed for the provision of fish-cultural facilities at the Bureau of Reclamation's Elephant Butte Reservoir, in Arizona.

The work of maintaining good fishing in national-park waters has been prosecuted vigorously with the sympathetic cooperation of the National Park Service.

Cooperation with the United States Forest Service in the management of fishing waters during the past year has been very effective

despite limited funds and personnel on the part of the Bureau. Under the terms of the cooperative agreement with the Forest Service the Bureau of Fisheries assumes responsibility for conducting research necessary for the development of a comprehensive program of fish management for waters of the national forests. The chief activities in this field have been concerned with the improvement of streams and with providing feeding and resting areas for trout. At the end of the last fiscal year the Bureau conducted a training school in Utah and North Carolina for stream technicians of the Forest Service. These technicians then undertook an extensive program of stream conditioning in the various national forests directing the efforts of the Civilian Conservation Corps in the removal of obstructions of various kinds that interfered with the movements of fish, the planting of shade trees to protect and beautify the streams, and the correction of the ravages of deforestation and erosion by installing dams and deflectors to control the water flow and to create resting pools for trout and improved feeding and spawning areas.

In view of urgent need for further information on the value of stream improvement and of other means of improving fishing conditions in the national forests, arrangements were made for a number of experimental projects to be carried on in cooperation with the Forest Service and in some cases with State conservation agencies. In addition to the establishment of test streams in Vermont, such projects have been established in the Pisgah National Forest of North Carolina and in the Big Levels Game Management Area of the George Washington National Forest of West Virginia.

## ALASKA FISHERIES SERVICE

### ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

The control of commercial fishing in Alaska to assure the maintenance of the fisheries resources on a maximum scale of productivity was continued in accordance with the authority vested in the Secretary of Commerce by the act of June 6, 1924. Particular attention was given to securing an escapement of at least 50 percent of the salmon runs in all localities; a proportionately larger breeding reserve was required where evidences of depletion were apparent.

Because of the recurrent scarcity of red salmon in the important Bristol Bay region in calendar years divisible by five, the regulations issued for 1935 prohibited commercial fishing in that district. As the season advanced, however, larger runs appeared than had been anticipated, and certain waters were opened for limited fishing after July 3. A few other modifications of existing regulations were made during the season, among which was the curtailment of fall fishing in parts of southeast Alaska where there had been an inadequate escapement from the earlier runs of breeding salmon to the spawning grounds.

Under the revised regulations, issued on February 8, 1936, six fewer trap sites were open than in the preceding year, the salmon-fishing season was lengthened in several districts, additional localities were opened to gill nets, and in the Cook Inlet area there was a shortening of the required distance interval between gill nets. Greater pro-

tection was provided for the herring in southeast Alaska and for the crab fishery.

Twelve regular and 170 temporary employees, in addition to the crews of 14 vessels of the Bureau and 2 chartered vessels, participated in the patrol of the fishing grounds. Chartered airplanes were used for a supplementary patrol in southeast and central Alaska, chiefly during the weekly closed periods, and for inspection of the spawning grounds and general supervision of the Bureau's work.

Biological studies of the life histories of the Pacific salmon and herring were continued. Tagging experiments were conducted in southeast Alaska to develop additional information regarding migration routes of pink salmon and herring. Weirs for counting the escapement of spawning salmon were operated in 11 typical salmon streams as a means of determining the ratio of escape to catch and also to provide data needed in scientific investigations.

Insofar as practicable in connection with their patrol duties, stream guards removed log jams and other obstructions that hindered the passage of salmon to the spawning grounds. Further improvement in the natural propagation of salmon was accomplished in certain localities by the taking of predatory trout destructive to salmon eggs and fry. In addition to the appropriation by the Territorial legislature and contributions from local salmon packers for this purpose, an allotment was made by the Works Progress Administration from funds available under the Emergency Relief Appropriation Act of 1935, which permitted an extensive predatory-fish control program in the Bristol Bay district in the 1935–36 season. Funds were provided also by that administration for repairing the marine ways at Naknek and for the construction of a fish ladder and other stream improvement in southeast Alaska. The total expenditures from the W. P. A. allotment amounted to approximately $45,000.

The Commissioner of Fisheries was in Alaska during the greater part of August for personal observation of fishery activities. Earlier in the season Deputy Commissioner Jackson inspected the Bureau's operations in Alaska, both in respect to the fisheries and the Pribilof Islands fur-seal industry.

### ALASKA SALMON HATCHERIES

Only one salmon hatchery was operated in Alaska during the year—at Hugh Smith Lake, in the southeastern district. A collection of 34,383,000 red-salmon eggs was made in 1935, from which 32,531,000 fry were produced and liberated in Alaska waters. At the rate of 40 cents for each 1,000 red or king salmon fry liberated, as provided by the Alaska Fisheries Act of June 26, 1906, the owners of this hatchery therefore were entitled to a rebate of $13,012 on license fees and taxes on their catch and pack of salmon.

### PRODUCTS OF THE FISHERIES

While the quantity of Alaska fishery products in 1935 was considerably less than the record output of the previous year, it compared favorably with the average level of production. A marked feature of the 1935 season was the exceptionally small pack of red salmon, owing to comparatively light runs of this species in several districts and especially to curtailment of operations in the Bristol

Bay area in an effort to stabilize the future yield in that locality. The suspension of operations for several weeks in the Copper River region as a result of price disagreements between packers and fishermen also was a factor in limiting the season's output of red salmon. The total number of canneries operated decreased from 110 in 1934 to 99 in 1935.

Salmon products comprised approximately 72 percent in quantity and 88 percent in value of the total output of the Alaska fisheries in 1935. About 94 percent of the salmon products consisted of canned salmon, the pack amounting to 5,133,122 cases, valued at $25,768,136. Red salmon represented 16 percent and pinks 63 percent of the total pack of canned salmon, as compared with 35 percent and 51 percent, respectively, in 1934.

Operations in the herring industry were marked by a further expansion in the manufacture of meal and oil, a number of reduction plants having been opened for the first time in the Kodiak district. The production of Scotch-cured herring was more than twice that of 1934. Landings of halibut credited to the Alaska fleet in 1935 were considerably less than in the preceding year. Both the quantity and value of whale products increased, although fewer whales were taken than in 1934; there was also an increase in several of the minor fishery products, including clams and shrimp.

The total output of Alaska fishery products in 1935 was 366,351,000 pounds, valued at $31,231,000, as compared with a yearly average of 376,193,000 pounds, valued at $34,079,000 for the 5-year period from 1930 to 1934, inclusive. The value of the 1935 catch to the fishermen was approximately $8,703,000, or about $3,004,000 less than in the preceding year. There were 22,620 persons employed in the various branches of the fisheries, as against 26,190 in 1934.

## ALASKA FUR-SEAL SERVICE

### GENERAL ACTIVITIES

With the continued growth of the Pribilof Islands fur-seal herd under Government management the number of surplus male seals available for commercial use has gradually increased. In 1935 the take of sealskins was the largest in 46 years. A staff of Bureau employees directed sealing operations performed by natives of the Pribilofs and by approximately 80 temporary laborers from the Alaska Peninsula and Aleutian Islands. The Fouke Fur Co., of St. Louis, Mo., sent 23 of its men to assist with the work, particularly with the blubbering of sealskins on St. Paul Island. Most of the skins on the island are taken by the stripping process, which necessitates the removal of blubber before curing.

In 1935 the by-products plant on St. Paul Island was operated for the first time since it was reconditioned and equipped with modern machinery in 1931. About 78 tons of meal and 19,000 gallons of oil were produced, limited quantities of which were retained at the islands for fox feed. The bulk of the meal was shipped to the States for use as fish food at hatcheries of the Bureau, and the oil was sold in Seattle to the highest bidder.

Besides the usual upkeep and repair of buildings and equipment, a new schoolhouse on St. George Island was completed before the beginning of the fall term, and extensions of improved roads were

made on both islands to facilitate the hauling of sealskins from the killing fields to the curing stations.

The Navy Department detailed the U. S. S. *Sirius* to transport the annual supplies to the Pribilofs and to bring out the season's take of sealskins. Valuable cooperative service was performed also by the Coast Guard in maintaining a patrol for the protection of fur seals during their northward migration and at the Pribilof Islands.

Fifteen percent of the sealskins taken on the Pribilof Islands in 1935 were delivered to the Dominion of Canada, as provided by the North Pacific Sealing Convention of 1911. The Government of Japan also is entitled to 15 percent of the annual take but receives its share from the net proceeds after the processed skins are sold at public auction.

Two hundred and one sealskins taken by the Japanese Government on Robben Island in 1935 were allotted to the United States in accordance with treaty provisions. They were received by the Fouke Fur Co., selling agents of the Department, at St. Louis, Mo., on January 2, 1936.

### SEAL HERD

As of August 10, 1935, the computed number of animals in the Pribilof Islands fur-seal herd was 1,550,913, an increase of 120,495, or 8.42 percent, over the corresponding figure for 1934.

### TAKE OF SEALSKINS

In the calendar year 1935 there were taken on the Pribilof Islands 57.296 fur-seal skins, of which 45,824 were from St. Paul Island and 11,472 from St. George Island. This is an increase of 3,826 over the number taken in 1934.

### SALE OF SEALSKINS

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis, Mo., in the fiscal year 1936. On September 16, 1935, 11,869 black dyed, 11,831 Safari brown dyed, 650 logwood brown dyed, and 79 miscellaneous skins were sold for $569,708.10. At the same time 125 Safari brown dyed and 75 raw salted Japanese fur-seal skins were sold for $2,762.25, and 14 confiscated fur-seal skins, parchments, for $69. The Japanese skins had been allotted to the United States as its share of such skins taken in 1934.

At the second sale, held on April 27, 1936, 9,721 black dyed, 12,154 Safari brown dyed, and 498 logwood brown dyed skins were sold for $600,770.25. At the same time 171 Safari brown dyed, 1 washed and dried, and 29 unhaired and dressed Japanese fur-seal skins were sold for $4,814.75. These 201 skins were the United States Government's share of sealskins taken by the Japanese Government on Robben Island in 1935. There was sold also 1 confiscated fur-seal skin, raw salted, for $1.

Special sales of Pribilof Islands sealskins authorized by the Secretary of Commerce in the fiscal year 1936 consisted of 830 black dyed, 1,274 Safari brown dyed, and 25 exhibition skins, at a total of $53,377.92.

### FOXES

The herds of blue foxes on St. Paul and St. George Islands require little care and produce sizable yields of pelts each year. Salted seal meat and prepared rations are fed to the animals during the winter months when the supply of natural food is scarce.

In the 1935–36 season 220 blue and 9 white fox skins were taken on St. Paul Island and 799 blue and 6 white skins on St. George Island, a total of 1,034. Six foxes trapped on St. Paul Island and 116 on St. George Island were marked and released for breeding stock. The reserve includes also many animals that did not enter the traps.

The 983 blue and 19 white fox skins taken in the 1934–35 season were sold at public auction in the fiscal year 1936. The blue pelts brought $24,952.50, and the white $304, a total of $25,256.50.

### FUR-SEAL SKINS TAKEN BY NATIVES

Under the provisions of the North Pacific Sealing Convention of 1911, aborigines of the Pacific coast may take seals at sea by primitive methods. The sealskins thus obtained must be authenticated by Government officials before they can enter into commerce. The number of sealskins taken and authenticated in 1935 was 975, of which 59 were secured by natives of southeast Alaska, 75 by natives of Washington, and 841 by natives of British Columbia.

### FUR-SEAL PATROL

A patrol for the protection of the Alaska fur-seal herd was maintained by vessels of the United States Coast Guard, supplemented in the spring by two of the Bureau's fishery patrol vessels.

### PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

Walruses and sea lions in Alaska may be taken under restricted conditions, but the killing of sea otters is prohibited at all times.

In 1935 four residents of the Kodiak Island region were tried at Valdez and convicted of illegal killing of sea otters in the previous year. Several sea-otter skins which they had taken were confiscated by the Bureau during the year for sale at public auction for Government account.

## PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

In listing an output of 8,120,000,000 eggs and fish from Federal hatcheries during the fiscal year 1936, there must be explanation as to the exact nature of this summary. The foregoing figure represents a maximum production from Federal hatcheries for any one year since their establishment. It is an increase of over 3 billion in excess of the 5 billion produced last year. However, the greater part of this increase is represented solely by eggs and fry of four marine species handled at three of the hatcheries in the New England area. In fact, 6¾ billion cod, haddock, pollock, and winter flounder were produced here. This work involves both the incubation of the eggs at the hatcheries and the planting of the fertilized eggs directly on the spawning grounds by spawn takers who have been placed aboard

the commercial fishing vessels for the purpose of salvaging such eggs as may be obtained from the commercial catch. This form of by-product recovery is a relatively inexpensive contribution to the maintenance of the important New England shore fisheries. However, increases in output were recorded for other varieties, particularly game fish.

Owing to the large total, the relative percentage of game fish produced at the Federal hatcheries will be lower than heretofore, but the actual number is in excess of the output of last year. This is reflected in an increase in the distribution of larger fish or fingerlings from 133,600,000 to 157,000,000. There was no deviation in the list of various species propagated. As heretofore, trout eggs were allotted to the States wherever there was a surplus beyond the requirements of the Bureau's hatcheries.

### PROPAGATION OF COMMERCIAL SPECIES

*Marine species, Atlantic coast.*—There has been cited previously the record-breaking production of cod, haddock, pollock, and flounder, derived from the three hatcheries located at Boothbay Harbor, Maine; Gloucester, Mass.; and Woods Hole, Mass. Four and one-half billion eggs were planted on the spawning grounds, the balance being transported to the hatcheries to be incubated and distributed as fry. The Woods Hole, Mass., station handled a limited number of mackerel in addition to the species mentioned above.

*Pacific salmon.*—Hatchery operations with the salmon of the Pacific coast were somewhat more successful than during 1935. A most gratifying increase was achieved in the production of chinook salmon, due to the excellent egg collections in the Columbia River territory. Also, the distribution of 17½ million sockeye salmon brought the output of this species up to normal. A few more silver salmon were handled; but there was a regression in the production of the chum salmon, which, however, is the least valuable of the five species.

*Anadromous species, Atlantic coast.*—An output of 12 million shad fry was substantially the same as the output of the previous year. Distribution of a million and one-half Atlantic salmon was a notable increase for this valuable species, which is making a gradual comeback in the State of Maine. Yellow perch fry were produced in large numbers at the Potomac River hatchery, though fewer than those produced the previous year. Effort was made to hatch shad at a new pond-fish hatchery at Harrison Lake, Va., but conditions were unfavorable. Shad cultural operations in South Carolina, in cooperation with the State, failed to reach the usual magnitude, owing to extremely adverse weather conditions.

*Commercial species, interior waters.*—This type of fish culture is prosecuted on a relatively limited scale at the present time. Slightly over 5 million whitefish fry were planted and less than a million lake trout and a limited number of lake herring were distributed. It has become extremely difficult for the Cape Vincent, N. Y., station to obtain a supply of eggs of these species and the Duluth, Minn., station is only able to obtain scattering quantities during the regular fishing season. The two Michigan hatcheries, closed during 1934, have remained inactive. At the Put in Bay, Ohio, station, work is

conducted on a joint basis with the State. The Bureau assists in the collection of eggs which are incubated at the State hatchery and the distribution records therefore do not figure in the Bureau's summary. The Federal hatchery at Put in Bay hatched over 500 million pike perch during the spring months, however.

*Game species.*—The legion of sportsmen throughout the country will be glad to know that the Federal hatchery system provided a larger number of several of the more popular varieties. The fisherman of 2 or 3 years hence will benefit by an increase in the distribution of steelhead salmon, rainbow trout, and particularly largemouth and smallmouth black bass. Production of the latter was brought to more than 5½ million, which is still inadequate in view of the tremendous demand for the premier warm-water game fish. The lesser varieties of pond fish, such as crappie, sunfish, etc., were also distributed in increased numbers. A problem which is intensifying the need for greater hatchery production of game fish is the culmination of several years of effort in the building of artificial lakes for recreation, power, flood control, and water storage. These new potential fishing areas presented a new demand for hatchery stock at a time when production was already insufficient to meet the normal requirements.

### RESCUE OPERATIONS

In connection with the administration of fisheries matters in the Upper Mississippi Wildlife Refuge, the usual rescue or salvage work was carried on in the sloughs during the late summer and early fall. Forty-three million seven hundred thousand fish were handled. While this was a decline of almost 4 million under the figures of the previous year, it approximates the normal average extent of this work.

The construction of the 9-foot channel in the Mississippi River through this area is affecting the rescue operations to some extent and ultimately will render such work unnecessary or impossible. As heretofore, the great majority of the fish rescued were returned directly to the river. Most of the shipments to other sections are being made from fish specially propagated in controlled ponds located at advantageous points in the refuge.

## FISHERY INDUSTRIES

### ECONOMIC AND MARKETING INVESTIGATIONS

*Manual for economic fishery surveys.*—A manual was prepared during the year to aid fishery management officials, teachers of economics, and others in making studies of fishery economics. This consists of schedules for obtaining primary market information, instructions for making surveys, sample forms for use in tabulating the data, and instructions for tabulating.

*Survey of fish hatchery foods and feeding practices.*—A survey made by the Bureau during the year showed that fish-hatchery operators used 11,455,000 pounds of fish food, valued at about $608,000, during 1934. Three-fourths of the volume consisted of such packing-house products as animal livers, hearts, and other animal organs. However, fishery products comprised a large portion of

the fish foods used by commercial hatcheries, since they were available at about one-third the cost of meat and dairy products.

*The oyster and oyster industry.*—A popular publication on oysters was prepared by the Bureau during the fiscal year. It covered such salient factors as the biology of the oyster, methods of capture and handling, its food value, and recipes for preparing it for the table.

*Cooperative marketing.*—Under authority of an act authorizing associations of producers of aquatic products, approved June 25, 1934, a cooperative marketing unit was established in the Bureau of Fisheries in October 1935. This unit has conducted studies on the prevalence of fishery cooperatives in the country, State legislation pertaining to such associations, the nature and extent of existing fishery cooperatives, and cooperative activities in foreign countries. A publication outlining the methods for organizing and incorporating fishery cooperative marketing associations also was prepared for dissemination to interested parties.

## STATISTICAL INVESTIGATIONS

### FISHERIES OF THE UNITED STATES, CALENDAR YEAR, 1934

*New England States.*—No complete statistical survey of the commercial fisheries of this area was made for 1934. The total landings of fish, however, by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 299,916,000 pounds, valued at $7,882,000—an increase of 18 percent in volume and 21 percent in value, as compared with the preceding year.

*Middle Atlantic States.*—No complete survey was made in this area for 1934. A survey made of the shad fishery of the Hudson River for 1934 showed 322 fishermen engaged and a catch of 438,000 pounds of shad, valued at $36,000—a decrease of 16 percent in volume and 12 percent in value as compared with 1933.

*Chesapeake Bay States.*—During 1934 the commercial fisheries of Maryland and Virginia employed 20,591 fishermen. Their catch amounted to 289,011,000 pounds, valued at $5,943,000—an increase of 6 percent in volume and 17 percent in value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 564 fishermen, who caught 567,000 pounds of shad, valued at $48,000, and 2,028,000 pounds of alewives, valued at $16,000.

*South Atlantic and Gulf States.*—The commercial fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas during 1934 employed 24,898 fishermen. Their catch amounted to 447,914,000 pounds, valued at $9,994,000—an increase of 49 percent in volume and 55 percent in value as compared with 1932 which is the most recent previous year for which a survey was made in this section.

*Pacific Coast States.*—The commercial fisheries of Washington, Oregon, and California in 1934 employed 19,232 fishermen. Their catch amounted to 1,546,102,000 pounds, valued at $19,950,000—an increase of 80 percent in volume and 43 percent in value, as compared with 1933. The total catch of halibut by United States and Canadian vessels amounted to 46,018,000 pounds, valued at $2,-

963,000—an increase of less than one-half of 1 percent in volume and 15 percent in value, as compared with the preceding year.

*Lake States.*—In 1934 the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, and Superior, Namakan and Rainy Lakes and Lake of the Woods of the United States and Canada) produced 124,148,000 pounds of fishery products. Of the total the United States accounted for 96,411,000 pounds, valued at $5,124,000—an increase of 29 percent in volume and 26 percent in value as compared with the United States catch in the previous year. The Lake fisheries of the United States gave employment to 7,579 fishermen in 1934.

*Mississippi River and tributaries.*—No complete survey of the commercial fisheries of the Mississippi River and tributaries was made for 1934. The catch of Lake Pepin and Lake Keokuk and the Mississippi River between these two lakes in 1934 amounted to 5,604,000 pounds, valued at $207,000—a decrease of 3 percent in volume and 11 percent in value as compared with the yield of the same waters in 1933.

### MANUFACTURED PRODUCTS OF THE UNITED STATES AND ALASKA, CALENDAR YEAR 1934

*Fresh and frozen packaged fishery products.*—Based on the most recent available data, the domestic production of fresh and frozen packaged fishery products amounted to 150,593,000 pounds, valued at $20,678,000. Important commodities in this group were fresh-shucked oysters, 6,207,000 gallons, valued at $7,772,000; packaged haddock, 36,666,000 pounds, valued at $3,801,000; and fresh-cooked crab-meat, 5,574,000 pounds, valued at $1,904,000.

*Frozen products.*—The production of frozen fishery products in 1934 amounted to 133,494,000 pounds, estimated to be valued at about $12,000,000. The volume of the production was 39 percent greater than in 1933; the most important products frozen were ground fish, halibut, salmon, mackerel, and whiting.

*Cured products.*—Based on the most recent data available, the domestic production of cured fishery products amounted to 98,141,000 pounds, valued at $13,047,000. Important products in this group were smoked salmon, 8,321,000 pounds, valued at $2,348,000; mild-cured salmon, 9,829,000 pounds, valued at $1,841,000; and boneless cod, 8,993,000 pounds, valued at $1,637,000.

*Canned products.*—Canned fishery products produced in 1934 amounted to 700,157,000 pounds, valued at $80,021,000—an increase of 31 percent in volume and 34 percent in value as compared with 1933. Canned salmon alone amounted to 402,386,000 pounds, valued at $45,818,000. Other important canned products were tuna and tuna-like fishes, sardines, shrimp, mackerel, clam products, and oysters.

*Byproducts.*—During 1934 the value of the production of fishery byproducts amounted to $22,608,000—an increase of 29 percent as compared with the preceding year. Important products in this group were marine-animal oils and meals, and aquatic shell products.

### TECHNOLOGICAL INVESTIGATIONS

Technological research in the fisheries covers a broad field which necessarily involves the sciences of chemistry, engineering, bacteri-

ology, pharmacology, and general food technology toward the development of new processes and methods, the salvage of waste products, and toward the more complete utilization of the fishery harvest. Such investigations by the Bureau's technological staff have included the study of many problems in connection with the preservation of fishery products for food, in determining the role of bacteria in preservation and decomposition, in pharmacological studies of the metabolism of the mineral constituents of fishery products, in the preservation of fishery byproducts, in the nutritive value of aquatic products, and in fish cookery.

*Preservation of fishery products for food.*—Studies in this field include an expansion of the knowledge of the chemistry of fish preservation and spoilage, the development of electrometric tests for determining the freshness of various fish, methods for smoking fish, studies of rancidity in fish, the chemical composition of fish proteins, and the development of methods for canning aquatic foods. The problem of the rancidity of the oil or fat in such fatty fish as mackerel has been an acute one wherever it has been necessary to store these fish for any substantial period of time. Various harmless antioxidants are being tested to determine their possible value in preventing or retarding the rancidity which develops in these fish under commercial storage conditions. This work has not progressed to a point where definite recommendations can be made as yet. The electrometric test for determining the relative freshness of fish has been published for haddock and has been worked out for cod and pollock. The importance of fish proteins in the diet is determined by the kinds and amounts of amino acids which make up the chemical composition of such proteins. This work is of fundamental importance and it is hoped that sufficient progress will be made for the issuance of a publication by next year. During the past year the Bureau has published a report on the canning of aquatic foods.

*Bacteriological studies.*—These investigations include the development of disinfectants for sponges for household use, bacteriological examinations of experimentally canned fishery products, and studies of the role of bacteria in the preservation and decomposition of fish.

*Pharmacological studies.*—This is a new and extremely interesting investigational field as far as fishery products are concerned. It includes a study of the role of the mineral constituents of fishery products in the metabolism of man and his domestic animals. Several publications on this work have been issued by the Bureau during the past year, covering the metabolism of arsenic and copper as they occur naturally in fish and shellfish.

*Preservation of fishery byproducts.*—The Bureau's technological investigations in this field have been of great value to the agricultural industry, as such fishery byproducts as fish oil and fish meal are unexcelled animal feedstuffs. Fish oils and fish-liver oils are not only vitally important as a source of vitamins for use in medicine and human nutrition but are essential to the poultry industry as a source of vitamin D to replace the inadequacy of sunshine. Fish meal is a splendid protein concentrate used in mixed feeds for various farm animals. This product also is used in fertilizers. The work during the past year in this field has consisted in the improvement of methods for manufacturing these products and in the development of new products.

*Nutritive value of aquatic products.*—Studies in this connection have included determination of the vitamin potency of various fish-liver oils, of the development of menhaden fish oil for poultry feed, menhaden fish meal in cattle feed, studies of the nutritive value of mackerel, the biological value and digestibility of fish proteins, and studies of the mineral constituents in fishery products. Publications have been issued on these various products.

*Fish cookery.*—Work in fish cookery has consisted in the development and testing of a variety of recipes for preparing fish and shellfish. There is a great need for work in this field as the average housewife knows little concerning the possible varieties in the cooking of fishery products. A new cook book, published by the Bureau about a year ago, proved very popular and over 60,000 copies of this publication have been distributed, in cooperation with the fishery industry.

## BIOLOGICAL FISHERY INVESTIGATIONS

Biological investigations of the fishery resources form the foundation of all conservation policies and recommendations of the Bureau of Fisheries. When the Bureau was first established, such investigations to discover the conditions and trend of the important fisheries, the causes for a decline in the supply of some which had been noted, and the devising of corrective measures were the sole functions of the organization; and these activities still constitute one of the most important branches of its work. During recent years investigations, organized on a continuing basis, are concerned primarily with (1) the tracing or foretelling of natural fluctuations in abundance of the important commercial species, (2) the management of interior waters including the stocking of lakes and streams with the most desirable food and game fishes at a rate consistent with the productive capacity of the various waters, with environmental control to increase productive capacity and with regulation of the catch to assure maximum production, and (3) the development of modern methods of water farming as applied to the shellfish industry.

### INVESTIGATIONS OF COMMERCIAL FISHES

*North and Middle Atlantic fishery investigations.*—In the North and Middle Atlantic, haddock, mackerel, squeteague or weakfish, and the flounder, scup, sea bass, and related species taken in the shore fishery and in the Southern winter trawl fishery, are the subject of study. With the upturn of fish prices during 1935, activity in the fishing business in the North Atlantic section has reawakened. Vessels tied up during the previous years have been placed in service and new ones are being built, while the efficiency of smaller vessels has been increased by additional motorization. Species hitherto neglected or regarded as trash fish, such as the rosefish and the sea robin, are being marketed in rapidly increasing quantities.

Observations on the condition of the resource during the past year indicate that the supply of haddock, the most valuable and important species in the North Atlantic fishery, generally remains low as compared with the abundance prevailing 10 to 15 years ago, although the stock of Georges Bank and of the South Channel, which are the most productive grounds, apparently has increased somewhat over

the previous year. Grounds for apprehension concerning the future of the resource still exist, as the production from areas nearer American ports has suffered a disastrous decline. Moreover, the distance from ports to grounds now most productive increases the cost of production.

The analysis of the commercial landings of the haddock fishery during recent years, based on personal interviews with captains, and size and age analysis of the population sampled by the commercial fishery, yield qualitative data regarding a change in the supply. Hampered by a lack of adequate personnel or sufficient funds, it has been impossible heretofore to study these changes quantitatively. It is essential to discover changes in the rate of natural reproduction and to evaluate as early as possible the abundance of young haddock year classes below marketable size as well as the natural rate of mortality. During the past 2 years the Bureau has had no vessel capable of making observations on the fishing grounds; hence one of the most urgent requirements of effective study of the commercial fishery in this and other regions is a sea-going research vessel, the construction of which was authorized by Congress in 1934 but for which no appropriations have been provided.

Mackerel in the North Atlantic area is at a high level of abundance, mainly as a result of the unusually productive spawning seasons of 1930, 1931, and 1933. Progress has been made in discovering the annual variations in natural reproduction which determine the number of mackerel in the sea and hence the success of the commercial fishery. Predictions of the yield for the following year have been issued with increasing accuracy at the beginning of each season for the past 9 years, and a comprehensive account of the major features of the biology of the mackerel that explains its startling variations in yield has been prepared for publication.

During 1935 the commercial yield of mackerel reached 53 million pounds, the record for the present century. However, during the decade ending 1935, the average annual yield was 41 million pounds, which contrasts poorly with the average of 80 million pounds produced during the decade ending 1885. Investigations have shown that these remarkable changes in yield are caused mainly by changes in abundance of mackerel and only secondarily by variations in the rate of fishing or by extensive migrations of the fish. Further, it has been learned that the changes in abundance are due to great differences from one year to another in the number of young mackerel that survive to reach commercial size.

Investigations of the fisheries of the Middle Atlantic States are intended to provide a rational basis for more efficient utilization of the fishery resources from southern New England to North Carolina. The fisheries of this region are very productive and extremely diverse. If the fisheries are to be protected and at the same time utilized fully, two requirements must be met: (1) The life history and conservation needs of all important species must be known and, (2) some provision must eventually be made for unified administration which is essential because of the migratory habits and the interstate traffic in the production of the fishery.

A comprehensive study of the more important features of the life history of squeteague or weakfish has been completed during the

year and the preparation of a report is nearing completion. The outstanding feature is the fact that the squeteague spawn in inshore waters from Massachusetts to North Carolina in late spring and early summer. There is, however, uncertain survival of those spawned in northern waters. Those produced south of Delaware Bay spend their first year in the South and migrate northward as 2-year-old or older fish.

The fishery in southern waters, particularly in North Carolina, is unusually destructive to considerable numbers of young squeteague; but, because of the relatively slower rate of growth in southern than in northern waters, it is uncertain whether the restriction of fishing in the South would greatly augment the supply. It is apparent, therefore, that the problem of conservation presents quite different aspects according to the point of view from which it is examined. From the national rather than from the sectional point of view it is desirable to determine whether sufficient benefit would result from curtailment of the southern catch of yearlings to compensate for the resulting losses.

Similar destruction of immature scup, particularly in the newly developed winter trawl fishery off the Chesapeake capes, has been noted. This fishery, which developed rapidly into a major branch of the industry, has been subjected to study each winter since its origin and the effects of increasing exploitation of the scup have been observed.

*Shrimp investigations on the South Atlantic and Gulf coasts.*—The most important fishery of the region from North Carolina to Texas depends upon the common shrimp, which yields on the average 100 million pounds annually. Investigations of this fishery in cooperation with the various States has proceeded during the past year. Experience has shown that the shrimp supply fluctuates considerably from year to year in the different localities. These fluctuations indicate that definite changes in the population of shrimp occur, and that for a complete understanding of the fishery the nature of these causes must be determined. Consequently, the Bureau's investigations have been directed toward the discovery of the life history of the species.

During the year studies of sexual maturity and spawning indicate that, contrary to former beliefs, the shrimp in some localities may survive through two winters and spawn a second time. The character of food, which explains the concentration of shrimp generally about the mouths of rivers, has been ascertained, and studies of growth and larval development have been completed. Studies of migration during the year have shown that extensive and well-defined movements northerly and southerly occurred, particularly along the Georgia-Florida and the Texas coasts.

To test the intensity of the fishery, methods of tagging shrimp have been developed and applied. A total of 3,800 shrimp were tagged along the Georgia and Florida coast during the fall of last year, and the intensity of the fishery is evidenced by the fact that almost one-fourth of the tagged shrimp had been retaken by the fishermen and returned to investigators by December. During the coming year tagging operations will be extended throughout the entire area of the South Atlantic shrimp fishery.

During the fall and winter the majority of the larger shrimp disappear from their usual grounds, probably moving off-shore to deeper and warmer waters of the Gulf. Plans have been developed, therefore, through additional appropriations made by the last Congress, to equip the Bureau's motor ship *Pelican* for off-shore experimental fishing. It should be possible to determine whether this deep-water concentration occurs, and whether or not the shrimp congregate in sufficient quantities in these areas to make a commercial fishery feasible.

*Pacific coast and Alaska fishery investigations.*—Commercial fishery investigations on the Pacific coast and Alaska are confined mainly to the salmon and the herring. In the Pacific Northwest States the studies directed toward the management and conservation of the diminishing runs of sockeye salmon in Puget Sound and the Fraser River area and the runs of all species of salmon in the Columbia River (discussed previously) were continued; and in Alaska continued observations were made on the success of reproduction of red salmon in the Karluk River and the pink salmon and herring in southeastern Alaska. In addition a new and much needed investigation to measure variations in yield in the salmon fisheries of Alaska, dealing with the collection and analysis of daily catch records for the various types of fishing gear, was carried out during the past year.

In Puget Sound special attention has been given to a study of the sockeye salmon population spawning in the Fraser River and the coho salmon, the most important game fish in the Pacific Northwest. The trend of the sockeye salmon fishery at sea and in the sound has been studied by the collection and analysis of records of the commercial catch since 1915. This study will establish a solid foundation for active management of the fishery by the commission to be formed under the authority of the recently approved treaty between the United States and Canada. Observations on the life history of the coho salmon in Puget Sound have been conducted to determine changes in abundance and their underlying causes and to develop methods of rehabilitation of populations in streams now barren or depleted. Experiments have been conducted to determine the strength of the homing instinct by transplanting hatchery reared fish. Observations on rate of growth of fingerlings have also been made in different tributaries and extensive records have been obtained from both the commercial and sports fisheries to indicate the drain on the resource by these fisheries.

In Alaska the extensive series of observations over many years on the red salmon runs of the Karluk River on Kodiak Island have been continued to discover factors influencing the success of natural propagation in an attempt to forecast future runs more accurately. Another marking experiment was initiated in which nearly 50,000 fingerlings were marked by the amputation of a combination of fins. The commercial catch of the region was carefully observed to obtain records of marked adults returning from previous experiments. During the year complete returns from the 1929 spawning year were obtained. The escapement was 900,519 which bore a ratio to the spawning population of that year of 1.6:1 as compared with 2.2:1 for the 1928 escapement, and 1.8:1 for the 1927 escapement. This

indicates a progressive decline in natural productivity, the returns being below normal.

From the marking experiments it is apparent that mortality from the seaward migrant stage to adult stage is about 75 percent. Mortality during the fresh-water period from eggs to seaward migrants is calculated to be 99.5 percent, hence the determination of the factors causing this extensive mortality during fresh-water existence is of great importance since any material increase in survival during this period would have the greatest effect in increasing the commercial runs.

Similar studies on the supply of pink salmon, the most valuable species in southeastern Alaska, were continued during the year. Pink salmon were also studied in cooperation with the National Canners' Association from the standpoint of physical and chemical changes that occurred in the body during their spawning and migration from the sea. The results provide information relative to the seasonal changes in the market quality that is of primary importance in the canning industry.

During the past 2 years a statistical study of the commercial salmon fishery in southeastern Alaska has been under way involving the collection, compilation, and biometrical analysis of the daily catch records of various types of fishing gear employed in the Alaska salmon fishery. These records provide the basic data for studies on changes in the abundance and character of the salmon runs and competition between the various types of fishing gear, as well as information for the future delimitation of the fishing districts and the establishment of closed seasons for fishing in the region.

During previous years investigations of the herring fisheries in Alaska have demonstrated the existence of a considerable number of distinct races of herring, each inhabiting a restricted area. In some of these areas serious overfishing that has resulted in virtual destruction of the industry has occurred. Investigations have been conducted during the past year to delineate more accurately the areas inhabited by the separate races. Notable results include the perfection of a new method of tagging herring to trace their migrations and to secure the return of tagged fish.

*Great Lakes fisheries investigations.*—It is generally conceded that certain important fisheries in the Great Lakes have been depleted or are undergoing depletion from overfishing. The virtual disappearance of the cisco in Lake Erie since 1926 has been so dramatic that the fact of depletion brooks no argument, and the decline of the whitefish yield in the lake system in general and its rapid disappearance from formerly productive grounds in more recent years is well known. The valuable fisheries in the Great Lakes, however, are being maintained at only moderately reduced levels, chiefly by increasing dependence on other species such as the pike-perch, the yellow perch, the lake trout, and the various species of herrings and suckers. In order to measure the annual fluctuations in the abundance of these species, to discover the need for protection and to determine the value of fishery regulations, an analysis of the catch statistics gathered by the State of Michigan in Lake Erie, Lake Huron, and Lake Michigan has been undertaken as a major project. The basic tabulations have now been completed for all Great Lakes

waters under the jurisdiction of the State of Michigan for the 6-year period.

In addition to the statistical studies reports dealing with the life history and racial affinities of the several species of pike-perches have been completed. The remainder of the investigative program includes the preparation of seven reports covering major investigations completed in the field during the past several years.

### POLLUTION INVESTIGATIONS

The growing menace of pollution in the fresh waters of the United States by erosion and by municipal and industrial wastes has been accepted by many as inevitable because the basic facts—chemical, physical, and biological—concerning stream pollution generally have not been available. The menace is spreading not only throughout the various river systems but into the impounded waters as well, and threatens at various points the waters of the public domain and of the national playgrounds. Consequently remedial and corrective measures compatible with the interest of fisheries and with economic necessities have not been easy to define.

To meet this situation the Bureau of Fisheries has been conducting for some time investigations to ascertain (1) the natural conditions favorable for fish and other aquatic life in unpolluted waters, so that a polluted stream can be defined with fairness to all concerned; (2) the specific effects on fish and other aquatic life, and on the aquatic environment itself, of the various types of effluents which are being released into the fresh waters of the United States.

Much effort has been given to devising suitable tests that could be applied practically in the field in order to determine the extent of stream pollution. A set of water standards has been defined based upon the results of thousands of tests and analyses made in all of the major river systems of the United States. From these studies it has been possible to make definite recommendations for practical remedial measures in various cases of stream pollution; and a comprehensive report embodying the findings of this investigation has been completed for early publication.

### AQUICULTURAL INVESTIGATIONS

Researches in the field of aquiculture, or water farming, as applied to food and game fish in interior waters are intended to increase the efficiency of hatchery practices by stopping the loss from hatchery diseases; by greater economy in operation through the development of less expensive and more effective diets; by the rearing of fish to larger sizes so that they are better able to survive after planting; by the selective breeding of superior stocks of fishes with more rapid growth, greater egg production, and increased resistance to disease; by environmental control to improve the productive capacity of streams and lakes; and by the development of a more effective policy of stocking to assure the best distribution of the hatchery products in waters where the highest survival can be expected and the planting of fish in proper numbers and in proper localities to assure the greatest supply. In previous years research has been directed primarily toward proper hatchery technique and combating

diseases; but during the past year great emphasis was placed on field studies since it is impossible to use the production of our hatcheries to the best advantage until we learn more about the various factors that affect fish in natural waters. Our lack of information of these fundamental factors is the greatest obstacle at present in developing a scientific policy of fish management.

In pond-fish culture for bass and other warm-water fishes conducted on the basis of natural food production in ponds, previous experiments have determined the most satisfactory fertilizers to maintain food production. During the past year the quantities of fertilizers and the periods that reveal the limitations of productive capacity of the ponds and the maximum fish production have been determined.

More elaborate studies have been conducted on trout culture. Feeding experiments conducted at two of the Bureau's experimental hatcheries have involved the testing of various artificially prepared commercial diets and the substitution of cheaper foods for the standard diet of beef liver. Detailed researches conducted in cooperation with the State of New York and Cornell University have been developed along three lines: (1) continuation of the study of growth of four species of trout fed similar diets and maintained under similar conditions to determine the efficiency of food utilization; (2) the determination of the amount of food required per unit of weight to obtain the most economical production; and (3) chemical balance studies to determine the amount of phosphorus and calcium needed by growing trout.

Selective breeding studies have been conducted; and in addition to increased rate of growth and higher disease resistance previously developed, a strain of trout has been selected with high egg production and higher fertility of eggs.

As in previous years, the study of fish diseases was largely confined to investigations of epidemics in hatcheries and the development of better methods of control. The establishment of a pathological laboratory at Seattle, Wash., has made it possible to devote more attention to the diseases prevalent in the Intermountain region and the Pacific Coast States. Additional information regarding the causes and control of two relatively new diseases has been obtained; and a free clinic or disease service has been established and greatly expanded during the year for the examination of specimens of diseased fish sent in by hatchery superintendents for diagnosis, and for the furnishing of advice for treatment and prophylaxis.

### SHELLFISH INVESTIGATIONS

The scope of shellfish investigations previously conducted by the Bureau was greatly enlarged last year by the special appropriation of $100,000 for the study of oyster pests and the development of practical methods for their control in the Atlantic and Gulf States. In addition limited investigations of oyster and hard clam culture were continued in the waters of New England, the South Atlantic States and in Puget Sound. A special allotment of $20,000 was provided by the Public Works Administration for studies of the failure of oyster culture in York River, Va., allegedly caused by pulp mill wastes. All of this work has been carried out by the regular staff

of the Bureau augmented by 20 temporary investigators and 50 assistants whose period of employment varied from 3 to 9 months. Excellent cooperation was received from the various States, the Works Progress Administration, and the Transient Rehabilitation Camps which supplied about 110 relief laborers for the field investigations.

The oyster pest investigation was directed toward the control of three major organisms destructive of oysters: (1) the starfish infesting the waters of New England and the North Atlantic States; (2) the drill in the Delaware and lower Chesapeake Bays and extending as far south as Texas; and (3) the so-called "leech", the recent outbreak of which has destroyed extensive areas of oyster-producing bottoms in Florida. The problems of the destruction of oysters caused by the boring sponge and the conch, although of lesser importance, were also included in the project. Practical methods that can be used by the oyster industry for the control of these pests must be based on a thorough knowledge of their life histories and an understanding of their habits and activities.

Oyster pest investigations were also undertaken in the inshore waters of Florida, Alabama, and Texas. Previous surveys showed that the most destructive pests of this section are the borer and the "leech" or flat worm. Other pests associated with these, but whose relations as commensals or enemies are undetermined, are the boring sponge, boring clam, barnacles, and mussels.

During the summer of 1935 the oyster bottoms of the Texas coast were surveyed to discover the kinds and numbers of oyster pests present and to devise methods of control. Approximately 800 miles of coast line were examined between Corpus Christi Bay and Galveston Bay, examinations being made of commercial reefs to determine the condition of oysters, salinity, temperature, character of the bottom, and abundance of oyster pests. The most common organism infesting oysters is the boring clam. The borer, the common conch, and the boring sponge are also present in moderate numbers. In addition to pests, however, it was found that the greatest danger to oyster beds in this section is from occasional floods from the rivers of the coastal plain. Recommendations were offered to assist oyster growers in meeting these conditions and in managing their holdings.

Because of the increased activity in connection with the oyster pest control investigations, the regular studies for improving and promoting oyster culture were greatly curtailed. A study of the seasonal changes in the mineral content of oyster meats and its relations to environmental changes was conducted and completed during the year. In Long Island Sound variations in the quantities of copper, iron, zinc, and manganese of great nutritional and therapeutic value in the human diet were traced to aid in the producing and marketing of oysters of standard quality. Technical direction was also afforded to State officers in Alabama and the Works Progress Administration in their project of developing oyster-producing grounds.

On the Pacific coast a 5-year study of problems concerned in the cultivation of Olympia oysters in Puget Sound was brought to a conclusion. The purpose of this investigation was to determine factors influencing the spawning and setting of Olympia oysters in order to develop a system whereby oyster growers can be assured annually of an abundant supply of seed. Spawning habits, life and attachment

of the larvae, and the relations of spawning to physical conditions have been thoroughly investigated, with the result that practical guidance has been afforded the oyster growers in planting cultch at the proper time in relation to tidal cycles to assure an abundance of seed oysters.

As previously noted, an investigation was started at Yorktown, Va., to determine the effects, if any, of pulp mill wastes discharged in the York River on the oysters of this region. Formerly a productive ground noted for oysters of superior quality, production in the York River has in recent years dwindled alarmingly and oysters produced have been very poor quality. Preliminary experiments show that the effluent from the pulp mill is not sufficiently toxic to kill the oysters immediately, nor apparently is it responsible for a reduction in the quantity of plankton food available. Whether it exerts an influence interfering with the nutrition of the oyster or whether other physiological processes are involved will require careful experimentation; and, if it is found that wastes from the sulphate pulp process are harmful, corrective measures must be found. The work had not progressed far enough at the close of the year to afford positive evidence of these obscure points.

In addition to studies of oyster culture, investigations of the life cycle of the quahog clam were carried on at the experimental field laboratory at Milford, Conn. Spawning, growth, feeding, reactions to temperature and water salinity have been determined as a foundation for more practical studies on artificial propagation and farming of clams in the New England region.

## BLACK BASS AND ANGLERS DIVISION

Evidence of violations of the black-bass law was obtained in a number of cases, three of which were referred to the Solicitor for prosecution in Federal court. Seizures of black bass illegally transported interstate were made in a number of instances. Information showing violations of State laws was obtained in a number of investigations and turned over to the State authorities for attention.

While only a small number of State legislatures (11) met in regular session in 1936, some progress in black-bass legislation was made. There are still, however, seven States where there is no closed season on black bas, six States where black bass may be sold if imported from other States, and four States where the sale is restricted only during short periods of the year or from certain waters. Thirty-eight States now absolutely prohibit the sale of black bass at all times regardless of where they have been taken.

Among the advances made in State legislation during the fiscal year 1936, either by legislative enactment or regulation, may be mentioned the fact that four States adopted the part-time angler's license, two States reduced their daily limits, and three increased protection by lengthening the closed season. These improvements are in line with the Bureau's policies.

Generally speaking, black-bass protection materially advanced during the year. From reports received from deputy black-bass law inspectors and others it is believed black bass have increased in the past year, and fishing at the close of the fiscal year was much improved, excepting in those waters affected by drought.

Several of the Division's publications were revised. They cover such subjects as enforcement, books on angling, how, when, and where to fish, list of State officials, and tourist's licenses. Requests for information on these subjects reached the Division in ever-increasing numbers. More persons are interested in angling than ever before; the last tabulation by the Bureau of the number of anglers licenses issued by the States showed an increase of 265,375 over the previous issue.

Fishery Circular No. 20, containing the Federal black-bass law, and a synopsis of the State laws, published the first part of the fiscal year, was exhausted during the close of the year necessitating an early publication of a new issue which will be revised to include the latest changes.

## LIBRARY

The library of the Bureau, although housed with the Department of Commerce Library, is maintained as a separate unit by the Bureau. It is one of the finest collections of scientific works concerning the fisheries in the world. As such it attracts attention from students and scientists all over the country, and many foreign scientists avail themselves of its services. The Bureau's staff, of course, finds it invaluable as it serves both the Washington office and the field force.

The library at present consists of 43,036 volumes, 1,500 pamphlets, and 199 monthly periodicals.

## AQUARIUM

The past 12 months proved most conclusively the popularity of the aquarium located under the main lobby of the Department of Commerce Building. This consists of 50 aquaria and 3 center pools. The outstanding individual exhibit, maintained during the winter until late spring, was a miniature hatchery demonstration. Eggs of Lake Erie whitefish, Potomac River yellow perch and shad, brook trout, rainbow trout, and silver salmon were hatched. Biology classes visited the exhibit frequently to observe the progress of development.

Specimens and eggs were also supplied to other public aquaria as a means of mutual cooperation. Experimental work on the efficacy of permanganate of potash, in treatment of parasites and bacteria in aquaria, is proving effective.

The aquarium population varies in season, averaging about 55 species and 1,480 individuals during 1936.

## VESSELS

Fifteen vessels of the Alaska service cruised about 120,000 nautical miles in the fiscal year 1936, as compared with 118,000 miles by 13 vessels in the preceding year. The *Penguin* logged the greatest distance, with approximately 27,000 miles. The *Brant* covered about 14,500 miles, the *Eider* 11,000 miles, and the *Crane*, *Teal*, and *Scoter* each about 10,000 miles.

The *Penguin* made five round-trip voyages between Seattle and the Pribilof Islands, transporting personnel and emergency supplies. Inter-island service also was performed, and native workmen from

the Alaska Peninsula were transported to the Pribilof Islands to assist with the season's sealing activities.

The *Auklet*, *Kittiwake*, *Merganser*, *Scoter*, and *Widgeon* were engaged in fishery protective work in southeast Alaska during the 1935 season. The *Murre* operated in the Seward-Katalla district, and the *Eider* in the Kodiak area. The *Teal* was on Cook Inlet until the end of August and then was transferred to southeast Alaska for the fall patrol. The *Ibis* was at Chignik, the *Crane* and *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River. The *Blue Wing* patrolled the Bristol Bay area until the latter part of July, after which it was on duty in the Kodiak area.

The *Brant* was used for general supervisory work, cruising as far as the Pribilof Islands in Bering Sea, and also assisted with the patrol and survey of salmon-spawning streams in southeast Alaska.

In the spring of 1936 the *Brant* and *Crane* assisted with the fur-seal patrol in the vicinity of Neah Bay, Wash., and the *Kittiwake* performed similar duty near Sitka, Alaska. The last-named vessel was used also in herring-tagging operations. From February to April 1936 the *Eider* was assigned to the Works Progress Administration project of stream improvement in southeast Alaska.

## APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated $1,565,920 as follows:

| | |
|---|---|
| Salaries, Commissioner's office | $156,420 |
| Propagation of food fishes | 667,000 |
| Maintenance of vessels | 160,000 |
| Inquiry respecting food fishes | 172,000 |
| Fishery industries | 62,000 |
| Protecting seal and salmon fisheries of Alaska | 278,000 |
| Upper Mississippi Wild Life and Fish Refuge | 18,000 |
| Enforcement of black-bass law | 15,000 |
| Fisheries Cooperative Marketing Act | 12,500 |
| Shellfisheries investigation | 25,000 |
| Total | 1,565,920 |

MARINE BIOLOGICAL LABORATORY WOODS HOLE LIBRARY MASS.

U. S. GOVERNMENT PRINTING OFFICE : 1937

# ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1935 [1]

By Ward T. Bower, *Chief, Division of Alaska Fisheries*

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[1] Administrative Report No. 23, Appendix I to the Report of the U. S. Commissioner of Fisheries for 1936. Approved for publication, June 5, 1936.

## INTRODUCTION

The conservation of the fisheries of Alaska by means of protective regulations and the management of the Pribilof Islands fur-seal herd are among the major duties of the Bureau. This work in 1935 was continued along the same general plan as in previous years. The Commissioner and Deputy Commissioner of Fisheries each spent several weeks in the Territory during the summer for personal observation of fishery operations; activities at the Pribilof Islands also were observed.

Upon the basis of previous experience several changes were made in the fishery regulations, the most important of which was that curtailing the fishing season in Bristol Bay, where a small run of salmon was anticipated.

The total pack of salmon in Alaska compared favorably with the average production of recent years. The small pack of red salmon, occasioned by poor runs in the Bristol Bay, Alaska Peninsula, and Chignik areas and by fishermen's strikes in the Copper River area, was offset to some extent by a large pack of pink salmon in southeast Alaska.

In the patrol of the fishing grounds 14 Bureau vessels and 3 chartered boats were used, and 170 temporary employees were engaged for varying periods. Chartered airplanes were used effectively in this work and also in making surveys of the spawning grounds after the close of commercial fishing.

Scientific studies of salmon and herring were continued in cooperation with the Division of Scientific Inquiry during the year. Attention was given to the routes of migration of salmon in Clarence Strait as indicated by tagging operations. Herring also were tagged to trace their movements and to determine the degree of interdependence of the various populations in southeast Alaska.

In connection with some of the biological work, and to determine the relation between the catch and escapement of salmon, 11 weirs were operated in typical streams, through which all ascending salmon were counted. At several weirs predatory trout were destroyed, and in Bristol Bay a program of trout control was started on a larger scale with funds allotted by the Works Progress Administration.

At the Pribilof Islands 57,296 fur-seal skins were taken, an increase of 3,826 over the number taken in 1934. Killings were confined as far as possible to 3-year-old males, and a sufficient number of such animals was reserved for breeding purposes. The census of the herd as of August 10, 1935, showed 1,550,913 animals of all classes, an increase of 120,495 over the corresponding figures for the previous year. During the winter of 1935–36, 1,019 blue and 15 white fox skins were taken from the herds at the islands.

Work was completed on the new schoolhouse at St. George Island during the year, and minor improvements were made to other struc-

tures. Roads on both islands were extended and improved to facilitate fur-seal operations.

The byproducts plant at St. Paul Island was put into operation for the first time since it was modernized in 1931, and although its efficiency was somewhat hindered by the long idleness, there was a substantial production of meal and oil.

The Navy Department cooperated with the Bureau in detailing the U. S. S. *Sirius* to transport the annual shipment of supplies to the Pribilof Islands and to bring out the sealskins taken during the season. Valuable assistance was rendered also by the United States Coast Guard in maintaining a patrol for the protection of the fur seals.

Acknowledgment is made of the assistance rendered by members of the Bureau's staff in the preparation of this document.

## VISIT OF THE COMMISSIONER OF FISHERIES AND OTHER OFFICIALS TO ALASKA

The Commissioner of Fisheries left Washington on July 22 for his annual trip of inspection of the Alaska fisheries. He sailed from Seattle on the *Brant* on July 28 and arrived at Cordova on August 8, after having stopped en route at various points in southeast Alaska. From Cordova a trip was made by airplane to Anchorage and the Matanuska colony. Fairbanks also was visited. Some additional airplane travel in southeast Alaska expedited the work in that district, and Commissioner Bell returned to Seattle on August 22.

Congressman C. Elmer Dietrich, of the House Committee on Territories, accompanied Commissioner Bell on the above trip. Besides making personal observations of conditions, he took a series of motion pictures of typical Alaska scenes, including salmon fishing and canning operations, and the new colony at Matanuska.

Earlier in the season Deputy Commissioner Charles E. Jackson made an extensive inspection of the Bureau's work in Alaska. Departure from Seattle was made on the *Brant* on June 1, and during the next few weeks all important fishing districts of the Territory were visited. On July 2 and 3 Mr. Jackson was at the Pribilof Islands to observe the fur-seal activities. He returned to Seattle on July 16.

## WORKS PROGRESS ADMINISTRATION

An allotment of $55,996 for special work in Alaska under the direction of the Bureau of Fisheries was made by the Works Progress Administration from funds available under the Emergency Relief Appropriation Act of 1935. Of this amount, $24,600 was designated for the improvement of salmon-spawning streams in southeast and central Alaska, and $31,396 for repairing the marine ways at Naknek and destroying predatory enemies of salmon in the Bristol Bay region.

Special permission was granted for employing persons from relief rolls on a piece-work basis in the destruction of predatory fish that feed upon salmon eggs and fry in the Bristol Bay region, and the work there was begun in October 1935 and continued throughout the winter. The program for improving natural salmon-propagation conditions in southeast and central Alaska was not undertaken before the end of the year, as the funds were not available until fall, when the presence of spawning salmon and approaching winter conditions made it necessary to postpone the stream-clearing work.

## FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects of special investigation or inquiry.

### EXECUTIVE ORDERS

The site at Yes Bay that had been reserved for a salmon hatchery in 1906 was restored to public entry by Executive order of May 31, 1935, as follows:

The Executive order of February 1, 1906, reserving and setting apart the following-described land and water areas in Alaska as a site for a salmon hatchery is hereby revoked, and the said areas are hereby declared to be a part of the Tongass National Forest as established by proclamation of February 16, 1909 (35 Stat. 2226):

Yes Lake (otherwise known as Lake McDonald) and its catchment basin, its outlet, and a strip of land one-eighth of a mile along each shore thereof; Yes Bay, Back Bay, and a strip of land one-eighth of a mile wide along the shores thereof and a strip of land one-eighth of a mile wide on each side of the old Indian trail.

Under date of October 24, 1935, an Executive order was issued designating Coast Guard vessels to assist in the patrol to enforce the provisions of the Northern Pacific Halibut Act. The text of the order is as follows:

By virtue of and pursuant to the authority vested in me by section 7 of the Northern Pacific Halibut Act (47 Stat. 142), I hereby designate such vessels of the Coast Guard as the Commandant of the Coast Guard shall assign for the purpose to patrol the territorial waters of the United States, as defined in the said act, for the enforcement of the said act and the Convention for the Preservation of the Halibut Fisheries of the Northern Pacific Ocean and the Bering Sea.

### NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued January 19, 1935, were amended by the following regulations issued by the Secretary of Commerce under the dates indicated:

[*June 26, 1935*]

ALASKA PENINSULA AREA

*Salmon fishery.*—Regulation No. 5 is amended so as to prohibit operation of any purse seine within 1,500 feet of any trap.

## Southeastern Alaska Area

### WESTERN DISTRICT

*Salmon fishery.*—1. Regulation No. 20 (*l*) is amended to read as follows: Admiralty Island: West coast (1) from 57 degrees 38 minutes north latitide to 57 degrees 39 minutes 15 seconds north latitude, (2) from 57 degrees 40 minutes 40 seconds north latitude to 57 degrees 45 minutes north latitude, (3) from 57 degrees 49 minutes 55 seconds north latitude to 57 degrees 51 minutes north latitude, (4) from 57 degrees 54 minutes 45 seconds north latitude to 57 degrees 56 minutes 20 seconds north latitude, and (5) from 57 degrees 57 minutes 50 seconds north latitude to 58 degrees 2 minutes north latitude.

2. Regulation No. 20 (*o*) is amended to read as follows: Admiralty Island: West Coast (1) from a point north of Wilson Cove at 57 degrees 10 minutes 30 seconds north latitude to 57 degrees 10 minutes 40 seconds north latitude, (2) within 2,500 feet of a point at 57 degrees 12 minutes north latitude, and (3) within 1,000 feet of a point at 57 degrees 13 minutes 50 seconds north latitude.

[*July 3, 1935*]

## Bristol Bay Area

*Salmon fishery.*—1. Commercial fishing for salmon is prohibited except within the following-described districts:

(*a*) Hagemeister district: Waters of Hagemeister Strait from 161 degrees 40 minutes west longitude to 160 degrees 38 minutes west longtitude.

(*b*) Nushagak district: Waters of Nushagak Bay within a line from Point Protection to Etolin Point.

(*c*) Kvichak-Naknek district: Waters of Kvichak Bay within a line from Etolin Point to Middle Bluff Light on the eastern side of Kvichak Bay.

(*d*) Egegik district: Waters between an east and west line 8 statute miles north of South Spit, Egegik Bay, and an east and west line 10 statute miles south of South Spit.

2. Commercial fishing for salmon shall be conducted solely by drift gill nets, set or anchored gill nets, and stake gill nets. The use of all other forms of fishing gear is prohibited.

3. Each drift gill net in operation shall be marked by a cluster of floats or corks at the ends, and double floats or corks shall be attached to the cork line at 25-fathom intervals. The clusters of floats or corks at the ends and the double floats or corks at the 25-fathom intervals shall be painted bright red and legibly and plainly marked with the initials of the operator.

4. Stake nets and set or anchored gill nets shall be operated in substantially a straight line.

5. Commercial fishing for salmon with stake nets or set or anchored gill nets shall be limited to beach areas between high and low water marks and shall be confined to the following places:

(*a*) Nushagak district: Along the beach, except on the west side of Nushagak Bay from a point 2 statute miles south of Bradford Point to Coffee Point, and except along the east side of that bay from the northern end of Ekuk Bluff to Etolin Point.

(*b*) Kvichak Bay: Along the beach on the southeast shore of the bay from Prosper Creek to Coffee Creek.

(*c*) Naknek Bay: Along the beach on each side of the bay to a point 1,200 yards above the drift gill net prohibitive markers and to a point 1,500 yards outside such markers.

(*d*) Egegik Bay: Along the beach on the north side of the bay to a point 2,000 yards outside the drift gill net prohibitive marker and on the south side of the bay to a point 5,000 yards outside such marker.

6. The combined take of red salmon for commercial purposes in the Hagemeister district shall not exceed 50,000 fish in any calendar year.

7. The total aggregate length of stake nets used by any individual shall not exceed 50 fathoms measured on the cork line.

8. The total aggregate length of gill nets on any salmon fishing boat, or in use by such boat, shall not exceed 150 fathoms hung measure.

9. King-salmon nets shall have a mesh of at least 8½ inches stretched measure between knots, and red-salmon nets shall have a mesh of at least 5½ inches stretched measure between knots as measured when actually in use. No red-salmon nets shall be over 28 meshes deep.

10. Commercial fishing for salmon is prohibited prior to 6 o'clock antemeridian July 4.

11. Commercial fishing for salmon is prohibited in the period from 6 o'clock antemeridian July 25 to 6 o'clock antemeridian August 3.

12. The trailing of web behind any fishing boat is prohibited above the markers fixing closed waters.

13. The use of motor-propelled fishing boats in catching salmon is prohibited.

14. Each salmon-fishing boat in operation shall be legibly and plainly marked with the initials or symbol of the person, company, or corporation owning, operating, or using same, together with a distinctive number which shall identify each particular boat, said letters, symbols, and numbers to be not less than 6 inches in length. Each person, company, or corporation operating two or more salmon-fishing boats shall have said boats numbered consecutively, beginning with number 1 for each plant. Boats operated by Alaska residents shall have in addition the letter "A" before the number. Each season, prior to the opening date for commercial fishing, the initials or symbol, and number of each boat shall be furnished in writing to the agent of the Bureau of Fisheries in charge of the district in which said boat shall operate.

15. The use of smelt nets is prohibited in localities where young salmon are migrating.

16. The 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian Tuesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 72 hours: *Provided*, That in the waters of Kvichak Bay between the line extending across the bay from the marker on a high point on the east bank of Prosper Creek, about 700 yards above the Koggiung cannery of the Alaska Packers Association, to the marker on the opposite side, the course being about north, 44 degrees west, magnetic, and the line extending across the bay from a marker at Jensen Creek, the course being north, 54 degrees west, magnetic, to a marker on the opposite shore about 1½ miles west of Squaw Creek, the 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeridian of Saturday of each week to 6 o'clock antemeridian of the Tuesday following and the period from 6 o'clock postmeridian Tuesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 96 hours.

17. All commercial fishing for salmon is prohibited as follows:

(*a*) Nushagak Bay: All waters northward of a line from a marker 2 statute miles below Bradford Point to a marker on the opposite shore at Nushagak Point: *Provided*, That stake nets or set or anchored gill nets limited to beach areas between high and low watermarks will be permitted to the old prohibitive line from Snag Point to the old village on the east bank.

(*b*) Kvichak Bay: All waters above a line extending at right angles across Kvichak Bay from the marker on a high point on the east bank of Prosper Creek, about 700 yards above the Koggiung cannery of the Alaska Packers Association, to the marker on the opposite side, the course being about north, 44 degrees west, magnetic.

(*c*) Naknek Bay: All waters within 1 statute mile of the mouth of the Naknek River: *Provided*, That stake nets or set or anchored gill nets limited to beach areas between high and low watermarks will be permitted on each side of the bay to a point 1,200 yards above the drift gill net prohibitive markers as well as to a point 1,500 yards outside such markers.

(*d*) Egegik Bay: All waters above a line extending at right angles across said bay from a marker on the north bank 250 yards east of Libby, McNeill & Libby's cannery building to a marker on the south bank 175 yards east of the Alaska Packers Association's new cannery building.

[*July 12, 1935*]

### Bristol Bay Area

*Salmon fishery.*—In addition to existing prohibitions, commercial fishing for salmon in the Nushagak district, which embraces the waters of Nushagak Bay within a line from Point Protection to Etolin Point, is prohibited from 6 o'clock antemeridian to 6 o'clock postmeridian of Tuesday of each week, and from 6 o'clock postmeridian Friday to 6 o'clock postmeridian Saturday of each week.

[*September 14, 1935*]

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

*Salmon fishery.*—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year: *Provided*, That this prohibition shall not apply to Glacier Bay, Excursion Inlet, and Port Frederick from September 23 to October 5, both dates inclusive.

WESTERN DISTRICT

*Salmon fishery.*—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year: *Provided*, That this prohibition shall not apply (1) to the use of purse seines in Hood Bay and Chaik Bay from September 23 to October 5, both dates inclusive, and (2) to the use of gill nets in Lynn Canal waters south of a line across Chilkat Inlet from Anchorage Point to the light on the opposite shore and south of a line across Chilkoot Inlet from Low Point light to Tanani Point, from September 16 to September 30, both dates inclusive.

EASTERN DISTRICT

*Salmon fishery.*—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year: *Provided*, That this prohibition shall not apply (1) to the use of purse seines in Security Bay and Port Camden from September 23 to October 5, both dates inclusive, and (2) to the use of drift gill nets in Taku Inlet through September 30.

SUMNER STRAIT DISTRICT

*Salmon fishery.*—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year.

SOUTHERN DISTRICT

*Salmon fishery.*—Commercial fishing for salmon, other than by trolling, is prohibited during the remainder of the calendar year.

Revised regulations effective in 1936 for the protection of the fisheries of Alaska were issued by the Acting Secretary of Commerce under date of February 8, 1936, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D. C.

## ANNETTE ISLAND FISHERY RESERVE

The Annette Island Canning Co. operated in the Annette Island Fishery Reserve, as in the previous year, under its lease from the Department of the Interior.

Eight traps operated by the company in the reservation caught a total of 964,741 salmon in 1935, and 48,552 salmon taken by seines were purchased from the natives. In addition, 823,063 salmon were purchased from independent operators of traps and seines outside the reserve. Of this number, 1,655 were sold to another company and the remainder were packed at the cannery. In the operation of the plant and the fish traps employment was given to 29 whites and 181 natives.

Profits to the Metlakatlan Indians of the reserve on the cannery operations for 1934 under the provisions of the lease amounted to $51,570.60. Preliminary estimates for the year 1935 place the figure at about $55,000.

## CULTURE OF JAPANESE OYSTERS

Japanese oysters, first introduced in the Puget Sound region, are now being raised on a commercial scale from California to British Columbia, and recent experiments indicate that the northern range of this industry may soon be extended to Alaska. The first reported planting of Japanese oysters in Alaskan waters was by B. E. Smith of Ketchikan in 1931, when 40 bushels of cull oysters from Puget Sound were distributed in certain bays south of Ketchikan. In the following 2 years he planted approximately 700,000 Japanese seed oysters, and in 1935 about 1,000,000 seed oysters were planted. The oysters are reported to have made a healthy growth in all instances, and a limited number have been marketed.

Other smaller plantings of Japanese oysters have been made by Al Weathers near Juneau, and by A. S. Day near Valdez, in central Alaska, and satisfactory results have been reported.

The expansion of this potential industry beyond the successful experimental stage already reached depends upon the modification of existing laws or the adoption of methods which will permit the growers to maintain title to their crop.

## STREAM IMPROVEMENT

No special program of stream improvement was carried on in 1935, but wherever possible in connection with their regular patrol duties stream guards removed log jams and other obstructions that blocked the passage of salmon to the spawning grounds, and in some places they cut trails through the brush to facilitate examination of the beds at the close of the season.

The destruction of Dolly Varden trout that feed on salmon eggs and fry was carried on in several localities under special allotments of Government funds and contributions from local salmon packers. In the Bristol Bay district a bounty of 2½ cents was paid, as in previous years, on predatory trout taken by bona fide residents of Alaska, funds for the purpose having been provided by the Territorial Legislature and by Bristol Bay packers. These bounties amount to approximately $15,000 annually. In the fall of 1935 an additional fund for Dolly Varden trout control in this district was created by the Works Progress Administration as a relief measure, thus making possible more extended operations throughout the winter. Special wardens of the Bureau had charge of counting all the trout that were taken and preparing the necessary vouchers.

Further work in the control of predatory trout was carried on in the Yakutat and Cook Inlet districts, where contributions of $1,000 and $3,200, respectively, were made by local packers. During the year 31,012 Dolly Vardens were destroyed in the Yakutat district and 208,799 in the Cook Inlet district. Weir crews in the Kodiak district operated traps and other gear for the capture of predatory trout and took 70,000 in Red River and 32,160 near the cannery station weir on Olga Bay.

## STREAM MARKING

New markers defining areas closed to commercial fishing were erected to replace those which had become illegible or damaged, and changes were made in the positions of others to conform with changes made in the regulations with respect to closed areas.

## STREAM GUARDS

The Bureau employed 170 men in 1935 as stream guards, weir operators, and special workmen in connection with law-enforcement duties. Of these, 82 were stationed in southeast Alaska, 60 in central, and 28 in western Alaska. Some of the workers were engaged for only a few days, but the average period of employment ranged from 2 to 5 months.

In southeast Alaska 35 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 12 guards were stationed in the Seward-Katalla district, 11 on Cook Inlet, 25 in the Kodiak-Afognak district, 4 at Chignik, and 8 in the Ikatan-Shumagin district. Five stream guards in the Seward-Katalla district furnished their own launches.

In western Alaska 24 were on Bristol Bay, and 4 in the Yukon-Kuskokwim district.

There were also eight special employees engaged in scientific work—two on herring and six on salmon investigations, this work being carried on in southeastern and central Alaska.

In addition, there were 12 statutory employees, 49 men on the Bureau's vessels, and 2 on the two chartered boats.

The foregoing makes a grand total of 241 persons identified with fishery protective work in Alaska in 1935, as compared with 237 in 1934.

## VESSEL PATROL

Fourteen vessels of the Bureau were engaged in the Alaska fisheries patrol in 1935, and one, the *Petrel*, was out of commission at Seattle. The *Auklet*, *Kittiwake*, *Merganser*, *Scoter*, and *Widgeon* were used in southeast Alaska; the *Murre* was on Prince William Sound, the *Ibis* at Chignik, the *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River. The *Eider* operated chiefly in the Kodiak area, although the voyage from Seattle in May extended as far westward as False Pass in order to transport employees and supplies to various stations; on the return trip to Seattle in August transportation was afforded passengers from Kupreanof Harbor and other points.

The *Teal* was used in herring-tagging operations in southeast Alaska in the latter half of March and the first week of April, in the patrol of the Cook Inlet area from May 7 to August 22, and in the inspection of spawning areas and the patrol of fishing grounds in southeast Alaska in the fall. The *Blue Wing* patrolled the Bristol Bay region from the middle of May until July 28 and then was transferred to duty in the Kodiak district. As in the preceding year, the *Crane* patrolled the Alaska Peninsula area and transported Bureau employees of the Bristol Bay district at the beginning and end of the season. The *Brant* was used chiefly in general supervisory work from June to August, inclusive, visiting all fishing areas and the Pribilof Islands, and afterwards assisted in the stream examination and patrol of southeast Alaska until the latter part of October.

Both the *Brant* and the *Scoter* engaged in the fur-seal patrol during the spring migration of the herd, the former operating off Cape Flattery, with base at Neah Bay, from April 9 until May 11, and the latter in the vicinity of Sitka from April 20 to May 27.

A speed boat equipped with a 125-horsepower marine engine was operated in the vicinity of Juneau. Three 80-horsepower speed boats were also in use—1 on Bristol Bay, 1 on Prince William Sound, and 1 in the Wrangell district. The speed boat on Prince William Sound was destroyed by an explosion on July 27. Its engine was salvaged and has been reconditioned for use in a new boat that will be built to replace the one lost. There were 19 skiffs and dories equipped with outboard motors in operation by the Bureau—2 in southeast Alaska, 3 in the Seward-Katalla district, 4 on Cook Inlet, 5 in the Kodiak area, 1 at Chignik, and 4 in the Alaska Peninsula area.

In addition to the foregoing, a few boats were charted for patrolling the fishing grounds, as follows: The gas boat *Mars* in the Ketchikan district, the *Wingham* in the Seward-Katalla district, and the launch *Marie S* on the Kuskokwim River.

## AERIAL PATROL

The use of airplanes under charter from commercial companies was again important in supplementing the vessel patrol of the fishing grounds in southeast Alaska and the Seward-Katalla district. Planes were used also to make inspections of some of the spawning grounds and to transport officials of the Bureau to isolated districts. During the 1935 season a total of 16,191 nautical miles was traveled in these activities, on 40 different days, the total flying time amounting to about 166 hours.

## COMPLAINTS AND PROSECUTIONS

A trap of Libby, McNeill & Libby at Arucenas Point, Suemez Island, was found set for fishing on the morning of July 29 before the end of the weekly closed period. The case was tried before the United States Commissioner at Ketchikan and a fine of $750 was imposed, plus $5 to cover the cost of hiring a trap watchman, upon payment of which the trap was released to the owner.

Five purse-seine boats in southeast Alaska were seized for fishing in closed waters. Of these, the *Bluebird*, with a crew of four, was operating within 75 yards of the mouth of White River, George Inlet. The owner, captain, and one other man pleaded guilty in the Commissioner's court at Ketchikan and were fined $75 each. The fourth member of the crew pleaded not guilty, and on trial by jury he was acquitted. In the case of the *Kansas* and *Leba*, each with a crew of 5 natives, which operated in closed waters near the mouth of Calder Creek, fines of $298.94 and $325, respectively, were imposed, while the salmon aboard the vessels at the time of their seizure were sold for $101.06 and $292.55, and the proceeds were turned over to the Department of Justice. A fine of $325 was imposed on the crew of five natives on the *Nora*, found fishing inside the markers at the mouth of Klakas Creek. Two fox farmers using the seine boat *Lois W* were fined $50 each for fishing in Calder Creek.

Two operators of gill-net boats, found fishing inside the markers at Taku River, were given a 3-month suspended sentence. A 60-day suspended sentence was imposed on the operator of the gill-net boat *Raven* for fishing inside the markers at the mouth of Mill Creek, and the gear was confiscated. A case was brought in the Commissioner's

court at Wrangell against another fisherman, found with wet seine and fish aboard his gill-net boat *T–1957* at the mouth of Mill Creek, but it was dismissed because of insufficient evidence.

Operators of the trolling boats *T–597* and *Judith* were arrested for fishing in a weekly closed period at a point 1¼ miles south of Point Rosary, Suemez Island. In the United States Commissioner's court at Craig the defendants were fined $200 and $150, respectively, whereupon they appealed to the United States district court. These cases were afterwards dismissed for lack of sufficient evidence.

A fine of $100 was imposed on the Alaska Pacific Salmon Co. for fishing with a gill net near Point Webster in waters not open to such apparatus. Two fishermen found operating beach seines in a closed season at the mouth of Petersburg Creek pleaded guilty before the United States Commissioner at Petersburg. One defendant was fined $50 and costs of $7.05 and his illegal catch was seized and sold for $30. The other was fined $100 and costs of $7.05 and was given a 30-day suspended sentence. A fine of $50 and a 90-day suspended sentence were imposed upon a fisherman who operated a purse seine as a beach seine in closed waters at the mouth of Barrie Creek, and a fine of $100 was assessed against a fisherman for using a beach net at the mouth of a salmon stream in Seclusion Harbor. Five fishermen in the Yakutat district were fined $10 each for setting a beach seine during a weekly closed period.

In the Seward-Katalla district three cases of illegal fishing for salmon in closed waters were tried before the Commissioner at Cordova. These cases involved four fishermen charged with operating two purse seines in Siwash Bay and three fishermen operating a purse seine within 500 yards of the mouth of a salmon stream in Eaglek Bay. Each fisherman was fined $25. A case against a fisherman found operating a purse seine in Galena Bay during a closed season was tried before the Commissioner at Valdez, and a fine of $50 was imposed. A clam digger was fined $10 for taking clams less than 4½ inches in total length of shell, the minimum size specified in the regulations. Another lot of undersized clams was weighed in at the cannery of W. R. Gilbert Co., but no digger claimed them. In both cases the clams were seized and sold and the proceeds were turned over to the Department of Justice. A fisherman charged with violating the law prohibiting aliens from fishing in Alaska waters was fined $100.

The case against the Copper River Packing Co., involving charges of illegal operation of three salmon traps after the close of the fishing season in 1934, was tried before the United States District Court of the Third Division of Alaska in the summer of 1935 and a fine of $500 was assessed.

Three cases of illegal fishing with gill nets during a weekly closed period were tried before the United States Commissioner at Anchorage. The four fishermen charged with the offense pleaded guilty and fines of $25 each were imposed, together with a 3-month suspended sentence. A complaint was also filed with the Commissioner at Anchorage against a fisherman charged with setting gill nets during a weekly closed period between Moose Point and Point McManus on the east shore of Cook Inlet. This case, which was pending at the end of the year, has been dismissed with a reprimand.

Three cases, also, were brought before the Commissioner at Seldovia. In one of these, two fishermen charged with operating a beach seine in Kamishak Bay before the fishing season opened were given a 3-month suspended sentence. Another case had to do with the operation of a beach seine by two fishermen inside the markers at the mouth of McNeill Creek. The men were fined $20 each and given a 3-month suspended sentence. The third case involved five men found fishing for the Puget & Alaska Canning Co. with two beach seines inside the markers at the mouths of salmon streams at the head of the west arm of Port Dick. Fines of $25 each were imposed on the fishermen and $100 on the company, upon payment of which, the boats and apparatus were released. The proceeds from the sale of salmon seized from the last-mentioned operators, amounting to $43.07, were turned over to the Department of Justice.

In the Chignik area two set gill nets belonging to Harry W. Crosby were observed fishing shortly after the beginning of a weekly closed period in July. No seizure of gear was made as the ebbing tide prevented the Bureau's patrol vessel from reaching shore. The case, however, has been dropped because of insufficient evidence.

## TERRITORIAL FISHERY LEGISLATION

The Alaska Legislature, at its biennial session in 1935, passed an act providing for the annual licensing of all persons engaged in taking clams for commercial use, fixing the fee for such licenses at $1 for each resident and $15 for each nonresident clam digger, said fees to be paid by the cannery, food market, or other commercial enterprise on the clam diggers it hires or from whom it buys, and prescribing penalty of not more than 6 months in jail, $500 fine, or both, for hiring, or buying from, a clam digger without a license.

Another act, designed to promote more intelligent and orderly marketing of agricultural and aquatic products, provides for the organization and operation of cooperative associations to be termed "Cooperative marketing associations" and defines their powers.

A further act, pertaining to the fishery as well as other natural resources, creates an Alaskan planning council to make inquiries, investigations, and surveys concerning the resources of all sections of the Territory, to assemble and analyze the data, to formulate plans, and to make recommendations as to the best methods of conservation, utilization, and development of resources, and to cooperate with public agencies in such planning, conservation, utilization, and development of resources.

Three acts pertained to the payment of bounty on hair seals, which destroy salmon and other fishes in certain localities. One of these acts extended the region in which the bounty of $2 on hair seals is applicable; one provided funds in the sum of $7,500 for payment of deficiencies in the appropriation for the biennium ending March 31, 1935, for payment of such bounty; and the third appropriated $30,000 for the payment of the bounty in the succeeding biennium. The last-named act also appropriated $15,000 for clearing salmon streams and destroying predatory trout.

## TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the general revenue law of 1921, as amended in subsequent sessions of the Territorial Legislature. A statement from Oscar G. Olson, Territorial treasurer, under date of May 9, 1936, gives the collections made to that date for the year 1935. It was stated that collections under the several schedules were fairly complete, although a number of the fisheries companies had not yet made full settlement. The outstanding salmon pack taxes amounted to approximately $125,000.

*Fishery license taxes collected by Territory for fiscal year ended December 31, 1935*

| Schedule | Division no. 1 | Division no. 2 | Division no. 3 | Total |
|---|---|---|---|---|
| Salmon canneries (pack) | $212,174.28 | | $600,273.28 | $812,447.56 |
| Clam canneries | 1.06 | | 557.04 | 558.10 |
| Salteries | 1,742.21 | $5.97 | 1,122.72 | 2,870.90 |
| Cold-storage plants | 900.00 | | | 900.00 |
| Fish-oil works and fertilizer and fish-meal plants | 10,063.56 | | 1,088.31 | 11,151.87 |
| Whale oil and fertilizer stations | | | 9,549.00 | 9,549.00 |
| Fish traps | 81,678.66 | | 49,981.23 | 131,659.89 |
| Gill nets | 369.00 | 6.00 | 226.00 | 601.00 |
| Seines | 5,675.00 | | 2,840.00 | 8,515.00 |
| Total | 312,603.77 | 11.97 | 665,637.58 | 978,253.32 |
| Salmon canneries (net income), not possible of segregation as to judicial division | | | | 27,612.85 |
| Total collections | | | | 1,005,866.17 |

## WATER-POWER PROJECTS IN ALASKA

Applications for permits for water-power projects in Alaska are referred to the Bureau by the Federal Power Commission for report as to whether the development of the project would be detrimental to the fishing interests. When the proposed project affects a stream in which salmon spawn, investigations are made in order to determine what measures are necessary to prevent impairment of the runs of fish, and if appropriate protection is not otherwise assured the application is rejected.

In 1935, applications were made for water-power projects at the following places: (1) a small unnamed creek flowing into the northeast arm of Uganik Bay on the west side of Kodiak Island; (2) a small unnamed creek on the north shore of Hood Bay on Admiralty Island; (3) Lost Creek and Upper and Lower Lost Lakes, north of Seward; (4) a small unnamed lake on Sitkalidak Island; (5) an unnamed creek on the north shore of Washington Bay, Kuiu Island. The last-mentioned application referred to a project which had been constructed and operating in trespass for about 17 years. As none of the streams concerned were used by spawning salmon, the Bureau made no objection to the utilization of the waters for power development.

## KUSKOKWIM RIVER

A patrol of the Kuskokwim River district was again maintained by Stream Guard Charles McGonagall, with a chartered launch. Two outfits fished near the mouth of the river for export from Alaska—that of Robert Gherkie and the floating plant *Anvil* of the Davis Fisheries,

Inc. The entire output consisted of 12 tierces of mild-cured king salmon, 448 barrels of pickled kings, and 244 barrels of pickled cohos.

Three hundred and forty-one natives fished in the river for local food requirements, using 395 gill nets of 6,820 fathoms, 50 wheels, and a number of small boats. They prepared 369 tons of dried chums.

## YUKON RIVER

Commercial operations at the Yukon River were carried on by three operators—Frank Kern and the Northern Commercial Co., who fished with gill nets outside the mouth, and the Akularak Mission, which used fish wheels about 30 miles up the river from the head of Sunshine Bay. Very light catches were made, however, and the total production for the outside market was but 131 tierces of mild-cured and 48 barrels of pickled king salmon. As good catches for local use were taken farther up the river in most places, the unusual scarcity at the mouth could be explained only by the fact that the fish, when they began to come in after having been held offshore late by the ice, kept to the main channel and deep water, and so escaped the nets.

The first king salmon were taken at the mouth of the river on June 11, and the peak of the run was from June 18 to June 27. The run of chums started at the same time as the kings and continued good to July 20.

Inspector C. F. Townsend and a stream guard aboard the *Coot* again patrolled the district. The vessel left the Government ways at Nenana on May 29 for the mouth of the river and returned there on September 14.

Products of the Yukon and Tanana fisheries, including the commercial output, were as follows: 185 cases of kings canned, 131 tierces of mild-cured kings, 13,875 pounds of kings and 5,100 pounds of chums pickled, and 349 tons of dried chums. Apparatus consisted of 247 wheels, 109 gill nets of 1,699 fathoms, 3 motor vessels of 68 tons, 2 power dories, 6 gill-net boats, 3 scows, and miscellaneous small boats. There were 18 whites and 357 natives engaged in the fishery.

## WEIRS FOR COUNTING SALMON ESCAPEMENT

Weirs for counting the escapement of salmon to the spawning grounds are operated in typical Alaska streams as a means of providing important information in connection with the salmon life-history studies and the regulation of the fisheries to assure a maximum yield. Of the 12 weirs that had been operated in the preceding year, all were reestablished and operated in 1935 except the one at Kaflia Bay. The Klawak weir in southeast Alaska, and the weirs at Chignik River, Chinik Creek, English Bay, Morzhovoi Bay, and Red River in the central district were installed under an allotment of funds from the Works Progress Administration that had been made available for the 1934 and 1935 seasons.

Reports of the weir operations and the counts of salmon in 1935 are as follows:

### KLAWAK CREEK

The weir in Klawak Creek, at the same location as in previous years, was completed on May 28, and the first red salmon were counted through on the following day. Pink salmon began to appear on

July 28, but the numbers were negligible until August 6, after which they increased gradually until August 26, when 20,103 of this species passed through the weir. Before the end of the month the daily escapement dropped to about one-fifth of this number and continued fairly steady thereafter for nearly 4 weeks, except on September 19 and 20, when the daily tally showed 48,178 and 42,645 pink salmon, respectively. When operation of the weir was discontinued at the close of October 10, the total count numbered 425,180 pink salmon, 32,924 chums, 20,028 reds, and 6,955 cohos. It was estimated that there were then in the harbor at the mouth of the river 15,000 salmon, consisting mainly of pinks and chums in about equal numbers. Lloyd M. Johnson was the weir foreman, under the supervision of Warden Alexander P. Romine.

### LITTLE PORT WALTER

Through the weir in the stream at the head of Little Port Walter, which is maintained primarily to supply information in connection with biological studies of pink salmon in southeast Alaska, 6,073 pink salmon were counted from August 12 to September 21, inclusive. About 250 pink salmon were in the stream below the weir when the structure was removed on September 22. S. J. Hutchinson carried on the weir operations at this place, under the direction of Dr. Frederick A. Davidson.

### SITUK RIVER

Counting of salmon at the Situk River weir began on June 7 and was discontinued on August 10, when high water submerged the structure and washed it out at one end. The total count was 163,303 reds, 20,593 pinks, 632 kings, and 34 cohos. It was estimated that with the additional numbers passing upstream after the weir was removed the total escapement of red salmon for the season was at least 175,000. An extension of 24 hours to the weekly closed period was made on July 15 to assure the required escapement of at least 50 percent of the run. The reported commercial catch of red salmon for the season from the Situk River run was 151,768. Weir operations were under the supervision of Assistant Agent W. W. Kinsey.

### ALITAK BAY

The cannery station weir on Olga Bay in the Alitak Bay region was completed on May 14, but it was not until May 27 that the first salmon passed upstream. Throughout the season the escapement was very irregular, which may be attributed, in part at least, to the fact that the stream was often very low. The highest count of red salmon for any one day was 17,799 on August 10, and the total count of reds for the week ending on that date was 25,550. The next highest weekly escapement was 14,656 red salmon in the week ending September 7. For the entire season the weir count numbered 85,025 red salmon, 5,662 cohos, and 640 pinks. There was still a large number of fish, chiefly cohos, in the lagoon at the time the weir was removed on September 12.

As in the previous year, no weir was maintained in the upper station stream, which harbors the largest run in the Olga Bay region. It was estimated that the escapement of red salmon there was 400,000. The run was light until the latter part of July, after which it increased and continued good until about the middle of September.

Predatory trout were taken from the cannery stream by means of a trap and seines, the total catch for the season being 32,160 Dolly Vardens.

Henry B. Looff was in charge of operations at this weir, under the supervision of Warden Charles P. Turner.

### CHIGNIK RIVER

The weir in Chignik River was placed about 125 feet below the site occupied in the previous year. Favorable weather and a low stage of the water facilitated the construction work, which was begun on April 22 and completed a month later. From June 23 to June 28 a freshet raised the river 2 feet, causing the weir to sag, though not enough to allow the salmon to pass over the top.

The red-salmon run, which began on June 2, was light throughout the season and reached its peak on July 2, with an escapement of 17,207 for the day. When counting was discontinued on September 14 the total escapement numbered 640,118 red salmon, 39,252 cohos, and 1,950 kings. The total commercial catch of red salmon from the Chignik run was 539,543.

Warden Charles Petry was in charge of the Bureau's operations at this place.

### CHINIK CREEK

Before installing the counting weir in Chinik Creek on June 8, the weir crew blasted the rocks to make a chain of five resting pools so that the salmon could more readily ascend to the spawning grounds. The first salmon passed upstream on June 18, and counting was continued until July 21, when the weir had to be taken out because of high water. The total count for the season was 16,036 red salmon, and it was estimated that between 4,000 and 5,000 ascended the stream after the weir was removed. Warden William B. Berry supervised the operation of this weir.

### ENGLISH BAY

The weir in the creek at the head of English Bay was installed on May 2 and the first salmon passed through 10 days later. From May 12 to August 9 there were counted 15,851 red salmon. During the season 6,101 Dolly Varden trout were taken out of this stream with a trap. The work at this weir was under the direction of Warden William B. Berry.

### KARLUK RIVER

At the time the Karluk weir was installed the river was comparatively high, but it dropped gradually and was at a very low level from the middle of June until early August. Although salmon were plentiful in the river mouth and the lagoon when the weir was completed on May 11, none passed upstream until May 22. A good run began on May 29 and continued heavy for a month, in which time nearly half the entire escapement for the season was tallied. The peak of this run was on June 8, when 60,346 red salmon were counted. Throughout July the run was very light, less than 12,000 red salmon passing through the weir. In the next 2 months conditions were materially improved, and there was a heavy run in the latter part of September. The highest count of red salmon for any one day was

84,877 on September 24. The total count of red salmon for the season was 876,335, and in addition, 26,919 cohos, 5,310 kings, and 5,786 pinks were tallied. Some fish were still in the lagoon when the weir was removed on October 5.

A good run of young red salmon migrating seaward began on May 29 and continued until June 17. Approximately 49,000 of these migrants were marked during the season. King salmon migrants came downstream in early August. The downstream run of Dolly Varden trout was unusually heavy.

On August 4 all the Karluk area except Uyak Bay was closed to commercial fishing, as the escapement of red salmon was less than the catch. The following day the section from Chief Point to West Point was reopened. Fishing in the remainder of the area was again permitted on August 19 until the close of the season on August 24. The total reported commercial catch of red salmon from the Karluk run was 661,573.

Weir operations at Karluk were in charge of H. H. Hungerford, under the supervision of Warden Charles P. Turner.

### MORZHOVOI BAY

A weir was again maintained in the stream that empties into Middle Lagoon, Morzhovoi Bay, through which salmon were counted from June 10 to October 5, inclusive. The season's escapement numbered 18,367 red salmon, 4,089 cohos, and 113 pinks. Operations at this place were carried on by Gordon Ashton at the beginning of the season, by Charles R. Sullivan in August and the first half of September, and thereafter by Axel Williamson, under the supervision of Assistant Agent Fred R. Lucas.

### ORZENOI RIVER

Construction of the weir in Orzenoi River was completed on June 13 and the first salmon passed upstream on June 22. From that date until September 6 there were counted 28,478 red salmon, 261 pinks, and 11 chums. The work was carried on by Woodrow F. Buckley until August 1 and then by Joe Evans, under the direction of Assistant Agent Fred R. Lucas.

### RED RIVER

A fair run of salmon was entering Red River when the weir was installed on May 26 and, although not heavy at any time, it remained steady until about the middle of August. Unlike the usual condition, no high water interfered with weir operations. The total count of salmon from May 26 to August 20 consisted of 517,769 reds, 4,089 pinks, 2,841 kings, and 541 cohos. Two traps for capturing predatory trout were operated by the weir crew, making a total catch of 70,000. There was a heavy downstream migration of young red salmon in the early summer. Under the supervision of Warden Charles P. Turner, the construction of the weir was in charge of Henry B. Looff and Tom Frost was weir foreman during the season.

## SALMON TAGGING

A salmon-tagging experiment was conducted in southeast Alaska in 1935 to develop further information concerning the migrations of

pink salmon through Clarence Strait. Nineteen hundred pink salmon were tagged during closed periods from July 27 to August 17, inclusive, all the work being done at the McLean Arm trap of the Alaska Pacific Salmon Co. Leroy S. Christey, temporary assistant, performed the tagging operations, under the direction of Dr. Frederick A. Davidson. The patrol vessel *Kittiwake* and later the *Scoter* were detailed to assist with the undertaking. A reward of 25 cents each was paid for the return of tags from the marked fish accompanied by information as to the time and place of recapture. The returns amounted to more than 33 percent of the total number of tags placed on the fish.

It is planned to conduct a similar experiment in Clarence Strait in 1936 to determine any differences in the migrations of the pink salmon runs in the even and odd years.

## SALMON LIFE-HISTORY STUDIES

Studies of the life histories and fluctuations in the abundance of the Pacific salmon in Alaska were continued in 1935 by the staff of the Fisheries Biological Station at Seattle, Wash. These studies are of necessity confined to definite localities, but it is felt that the information secured from them is in general applicable to the same species in all parts of the Territory. A major investigation dealing with the red salmon was conducted at Karluk, and one pertaining to the pink salmon was carried on at Little Port Walter. Biological data on the red salmon runs were also collected in the Bristol Bay, Chignik, and Copper River areas.

Salmon-counting weirs maintained at Karluk and Little Port Walter furnished data regarding the number of adults returning to the streams to spawn. The results from the studies at these two locations, together with information collected at various points throughout the Territory, indicate that the changes in natural conditions under which the young develop greatly influence the abundance of salmon. Efforts are being made to evaluate these natural factors in order to provide information relative to the probable abundance of each year's runs.

An investigation dealing with daily catch records of the principal types of fishing gear in the various fishing areas throughout Alaska was started during 1935, the primary aim of which is to secure information concerning the yearly fluctuations in the abundance and time of appearance of the salmon runs in each area. Information on these fluctuations, which are due to natural as well as artificial causes, is of importance in determining proper regulations for the conservation of the runs.

Studies dealing with the biological changes that take place within the pink salmon during the spawning migration and affect the quality of the commercial pack were continued during the year, in cooperation with the Seattle branch of the National Canners' Association. A preliminary report, entitled "Physical and chemical changes in the pink salmon during the spawning migration", has been prepared for publication as Investigational Report No. 33, by Frederick A. Davidson and O. Eugene Shostrom.

## UNUSUAL MORTALITY OF SALMON

A most unusual occurrence of the season, and one heretofore unrecorded in the salmon fishery of the Territory, was an alarming mortality among salmon and other species caught in traps along the west coast of Tuxekan Island from July 22 to July 28. So great was the mortality during this period that the operators in this restricted locality kept their traps closed and brailed no fish from them. Observations were made of the behavior of salmon held in the traps on several days. The first symptom of distress was the rising of the fish to the surface, after which they began gasping and weaving from side to side and then suddenly died. Samples of water and of dead salmon were collected for examination but did not reveal the cause of mortality. In addition to salmon, such diverse species as flounders, dogfish, and pollock were similarly affected.

## OBSERVATIONS ON THE ESCAPEMENT OF SALMON

The progress of the runs of salmon in each district in Alaska is observed closely by field employees in order that appropriate regulatory measures may be issued promptly to meet unexpected occurrences. After the close of fishing operations, representative spawning streams in all parts of the Territory are examined to determine the adequacy of the escapement.

*Southeast Alaska.*—Pink salmon in all parts of southeastern Alaska were of unusually large size and, except in the southern district, the runs were late. In the southern district this species appeared early and the run continued good to within a few days of the end of the season. Although the run was numerically weaker than that of 1934, a larger pack was realized in this district as a result of the large size of the individual fish. Red and chum salmon were much more plentiful than in 1934, and the run of cohos was of about the same magnitude as in that year. There was a sufficient escapement of all species to seed the spawning gravels properly in nearly all parts of the district. Conditions on the spawning grounds were good during the early part of the season, but the lack of rain in September and early October caused the stream flow to drop to a low level. This situation was relieved by late fall rains.

The salmon runs in the southern part of the Clarence Strait district were much the same as in the southern district. Particularly good escapements were noted in Karta River, Skowl Arm, and in the west arm of Cholmondeley Sound. In the northern part of the district the escapement was derived from late runs and was only fair.

The pink salmon run on the west coast of Prince of Wales Island was late, irregular, and much smaller than in 1934. The escapement of this species was generally poor, and especially small spawning colonies were observed in the important streams in the northern part of the district; although below average, the escapement was somewhat better in the southern part. The runs of reds and cohos were better than in the preceding year, and large runs of chums were observed throughout the district. Good escapements of these species were reported.

In the Sumner Strait district the runs were above average. The pink salmon run reached its peak about August 1, after which it steadily declined. The escapement, except in Anan Creek and Olive

Cove, was disproportionately small, owing to very intensive commercial fishing in these waters.

Late pink salmon runs of smaller than average proportions were reported in the Icy Strait, western, and eastern districts. This species continued to appear after the close of fishing operations, and fair escapements were observed in the western and eastern districts. The escapement of pinks in the Icy Strait district was unsatisfactory. The runs of reds, chums, and cohos also were below normal, although the red salmon runs in the western and eastern districts were somewhat better than in 1934.

Good runs of reds in the Yakutat district were associated with satisfactory escapements of that species. The runs of king and pink salmon were exceptionally small for this district, and only a fair run of cohos was observed. Chums are not an important species in the Yakutat region.

*Prince William Sound and Copper River region.*—The pink salmon run began in Prince William Sound in a small way at the opening date for fishing and increased in volume as the season progressed, but dropped off abruptly after the close of fishing. Throughout the season fish were much more abundant on the west side of the sound than on the east side. The escapement was irregular, the streams tributary to the east side with few exceptions being poorly seeded, while those in the northern and western parts of the sound were generally better supplied with spawning fish.

Labor trouble prevented operations during most of the red and king salmon runs to Copper River, and most of these fish escaped to the spawning grounds. A small run of reds was anticipated, and this beneficial escapement undoubtedly will be reflected in related runs of the future. The fall run of cohos was good, and as fishing was voluntarily limited the escapement was satisfactory. In Bering River the run of reds was below normal and, although most of the run reached the spawning grounds, the seeding was not adequate.

*Cook Inlet.*—The run of red salmon was comparatively small, but because of protective regulations and interruption of fishing operations by unfavorable weather conditions the escapement of this species was fair. The king salmon run and escapement were good. As anticipated, the pink salmon run was almost a failure, and so inadequate was the spawning that only another poor run can be expected to develop from it. Chums were less abundant than usual but the escapement, especially in the lower part of the inlet, was fair. Practically the entire run of cohos, which was of normal proportions, was allowed to spawn, as there was but little commercial interest in this species.

*Kodiak area.*—The runs of pink salmon were heavy in all parts of the Kodiak area and the escapement was uniformly large. Good runs of red salmon occurred in Karluk and Red Rivers, while in Alitak and Uganik Bays the runs of this species were below average. The runs and escapements of other species were fair but somewhat smaller than in 1934.

*Chignik.*—Throughout the season the run of red salmon was light and the escapement was correspondingly small, being slightly more than 50 percent of the run. The run of pinks, for an off year, was fair, as was the escapement also. The chum run was better than for several years, but the escapement was smaller than in 1934. The coho run and escapement were light.

*Alaska Peninsula.*—The runs of red salmon along the south side of the Alaska Peninsula and at Port Moller, reflecting the condition of the Bristol Bay runs, were far below average. This species was slow in appearing and few were canned prior to June 20. The pink salmon run on the south side of the peninsula was smaller than in 1934, but most of the spawning streams were observed to be well seeded. There was a fair seeding of chums also.

*Bristol Bay.*—The red salmon runs in Bristol Bay were much above expectations, and because of limited operations and additional protective measures the spawning escapement was good. Especially large runs were reported in Kvichak and Egegik Rivers. There was no commercial fishing in Ugashik River, and the entire run, except for a few fish taken for local use, reached the spawning grounds. It is believed that the escapement in all the rivers of Bristol Bay, except perhaps the Nushagak, was of such size as to build up this weak run of the cycle which has been apparent for many years.

## HATCHERIES

The privately owned hatchery on Hugh Smith Lake was again operated by the Pacific American Fisheries, Inc. From the 10,221,000 red salmon eggs that were collected at the hatchery in 1934, there were produced and liberated in Alaska waters 9,860,000 salmon fry. A collection of 34,383,000 red salmon eggs was made at this hatchery in 1935.

Under provisions of the act of June 26, 1906, the owners of private hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red salmon fry liberated by them in Alaska waters. In the fiscal year ended June 30, 1935, therefore, the rebate due the Pacific American Fisheries, Inc., on the 9,860,000 red salmon fry liberated at Hugh Smith Lake during the year amounted to $3,944.

## GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1935 was 22,620, or 3,570 less than in 1934. Fishery products were valued at $31,230,646, a decrease of $10,732,647, or about 26 percent from the preceding year. Of the total amount, 87.5 percent represented the value of salmon products; 7.6 percent, herring; 2 percent, halibut; and 2.9 percent, the value of all other fishery products.

*Summary of persons engaged and products of the Alaska fisheries in 1935*

| Items | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Number | Value | Number | Value | Number | Value | Number | Value |
| PERSONS ENGAGED | | | | | | | | |
| Whites | 6,581 | | 4,641 | | 1,399 | | 12,621 | |
| Natives | 3,596 | | 1,442 | | 1,163 | | 6,201 | |
| Chinese | 143 | | 245 | | 17 | | 405 | |
| Japanese | 609 | | 263 | | 60 | | 932 | |
| Filipinos | 1,314 | | 1,001 | | 94 | | 2,409 | |
| Mexicans | 17 | | 10 | | | | 27 | |
| Miscellaneous | 19 | | 5 | | 1 | | 25 | |
| Total | 12,279 | | 7,607 | | 2,734 | | 22,620 | |
| PRODUCTS | | | | | | | | |
| Salmon: | | | | | | | | |
| Canned ... cases | 3,054,038 | $13,910,783 | 1,802,231 | $9,431,018 | 276,853 | $2,426,335 | 5,133,122 | $25,768,136 |
| Mild cured ... pounds | 4,308,000 | 857,603 | 20,000 | 2,370 | 114,400 | 13,720 | 4,442,400 | 873,693 |
| Pickled ... do | 49,200 | 4,908 | 312,800 | 35,832 | 534,175 | 54,418 | 896,175 | 95,158 |
| Fresh, for food ... do | 2,943,017 | 167,784 | 8,619 | 643 | | | 2,951,636 | 168,427 |
| Frozen, for food ... do | 4,266,834 | 270,178 | | | | | 4,266,834 | 270,178 |
| Fresh, for fox feed ... do | | | 8,400 | 42 | | | 8,400 | 42 |
| Frozen, for bait ... do | 240,930 | 1,205 | | | | | 240,930 | 1,205 |
| Dry-salted and dried ... do | 38,100 | 4,471 | 21,800 | 1,962 | 1,436,000 | 114,960 | 1,495,900 | 121,393 |
| Smoked and canned ... cases | 45 | 225 | | | | | 45 | 225 |
| Caviar ... pounds | 17,000 | 2,100 | | | | | 17,000 | 2,100 |
| Fertilizer ... do | 900,000 | 13,500 | 271,900 | 3,263 | | | 1,171,900 | 16,763 |
| Oil ... gallons | 36,000 | 10,000 | 13,000 | 5,200 | | | 49,000 | 15,200 |
| Herring: | | | | | | | | |
| Fresh, for bait ... pounds | 2,059,055 | 22,059 | 273,750 | 2,665 | | | 2,332,805 | 24,724 |
| Frozen, for bait ... do | 3,626,670 | 25,788 | | | | | 3,626,670 | 25,788 |
| Frozen, for food ... do | | | 40,000 | 1,200 | | | 40,000 | 1,200 |
| Pickled, for food: | | | | | | | | |
| Scotch cure ... do | 2,187,000 | 116,612 | 9,343,325 | 543,055 | 3,412,425 | 148,397 | 14,942,750 | 808,064 |
| Norwegian cure ... do | | | 4,000 | 360 | | | 4,000 | 360 |
| Roused, for food (bloater stock) ... do | | | 108,150 | 3,245 | 1,211,320 | 31,548 | 1,319,470 | 34,793 |
| Spiced ... do | 1,000 | 160 | | | | | 1,000 | 160 |
| Dry-salted ... do | | | | | 314,775 | 7,551 | 314,775 | 7,551 |
| Meal ... do | 18,108,962 | 216,744 | 12,014,194 | 140,984 | | | 30,123,156 | 357,728 |
| Oil ... gallons | 2,239,730 | 669,385 | 1,552,679 | 444,339 | | | 3,792,409 | 1,113,724 |
| Halibut: | | | | | | | | |
| Fresh ... pounds | 5,936,134 | 363,525 | | | | | 5,936,134 | 363,525 |
| Frozen ... do | 3,869,546 | 244,320 | | | | | 3,869,546 | 244,320 |

*Summary of persons engaged and products of the Alaska fisheries in 1935*—Continued

| Items | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Number | Value | Number | Value | Number | Value | Number | Value |
| PRODUCTS—continued | | | | | | | | |
| Cod: | | | | | | | | |
| Dry-salted ... pounds | | | 80,210 | $3,417 | 26,598 | $1,138 | 106,808 | $4,555 |
| Pickled ... do | | | 32,789 | 1,130 | | | 32,789 | 1,130 |
| Stockfish ... do | | | 8,140 | 1,128 | | | 8,140 | 1,128 |
| Whale: | | | | | | | | |
| Oil ... gallons | | | 309,939 | 116,300 | 523,360 | 196,260 | 833,299 | 312,560 |
| Sperm oil ... do | | | 77,950 | 18,708 | 114,900 | 27,576 | 192,850 | 46,284 |
| Fertilizer ... pounds | | | 1,070,000 | 12,950 | 1,608,000 | 18,590 | 2,678,000 | 31,540 |
| Clam: | | | | | | | | |
| Canned ... cases | 738 | $3,634 | 33,371 | 193,647 | | | 34,109 | 197,281 |
| Juice ... do | 150 | 300 | | | | | 150 | 300 |
| Crab: | | | | | | | | |
| Canned ... do | 11,307 | 93,213 | 1,334 | 13,619 | | | 12,641 | 106,832 |
| Meat ... pounds | 93,998 | 35,904 | 43,908 | 17,703 | | | 137,906 | 53,607 |
| Whole in shell ... dozen | 1,242 | 2,582 | 194 | 307 | | | 1,436 | 2,889 |
| Shrimp: | | | | | | | | |
| Canned ... cases | | | 24 | 192 | | | 24 | 192 |
| Meat ... pounds | 371,029 | 126,355 | 856 | 294 | | | 371,885 | 126,649 |
| Whole in shell, fresh ... do | 9,777 | 1,407 | | | | | 9,777 | 1,407 |
| Raw frozen ... do | 1,629 | 652 | | | | | 1,629 | 652 |
| Trout: | | | | | | | | |
| Fresh ... do | 16,470 | 1,135 | | | | | 16,470 | 1,135 |
| Frozen ... do | 16,412 | 1,270 | | | | | 16,412 | 1,270 |
| Sablefish: | | | | | | | | |
| Fresh ... do | 80,516 | 4,428 | | | | | 80,516 | 4,428 |
| Frozen ... do | 478,769 | 18,093 | | | | | 478,769 | 18,093 |
| Pickled ... do | 6,161 | 318 | | | | | 6,161 | 318 |
| Rockfish: Frozen ... do | 5,344 | 189 | | | | | 5,344 | 189 |
| Flounder: Fresh ... do | 250,000 | 3,750 | | | | | 250,000 | 3,750 |
| Total | | 17,194,580 | | 10,995,573 | | 3,040,493 | | [1] 31,230,646 |

[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch, exclusive of whales, to the fishermen was approximately $8,703,000. The round weight of the salmon catch landed by the fishermen was approximately 434,004,000 pounds, and the corresponding figure for herring was about 189,287,000 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 4,422,411 pounds of dry-salted cod and 16,926 pounds of tongues, having a total value of $200,189, landed at ports of the Pacific Coast States.

## SALMON

The stringent curtailment of commercial fishing in the Bristol Bay region, for the purpose of building up weak runs of red salmon recurrent in the years divisible by 5, resulted in a small catch of all species in the western district in the 1935 season.

Red-salmon runs were light also at Port Moller and Herendeen Bay and in parts of central Alaska, notably the Ikatan-Shumagin region and Chignik. The output was also affected by prolonged price disagreements between packers and fishermen and cannery workers in the Copper River section, during which fishing operations were suspended. The total catch of red salmon in 1935 was less than one-third that of the preceding year, but it did not drop far below the catch for the comparable cyclical year 1930, notwithstanding the greater restrictions in the later year.

The number of pink salmon taken, although well above the average, was considerably less than the record catch of the preceding year. The individual fish, however, were of remarkably large size in many districts, so that the decrease from 1934 in the amount of products was not proportionate to the decrease in catch.

Commercial catches of the three less abundant species of salmon in Alaska in 1935 compared favorably with the average for recent years. Both chums and kings showed increases over 1934, while there was a decrease in the catch of cohos.

The total catch of salmon decreased 37 percent from that for 1934. By districts, the decrease was 31 percent in southeast Alaska, 17 percent in central, and 81 percent in western Alaska.

There was an increase of about 47 percent for the whole of Alaska in the number of fathoms of seines used, while the number of fathoms of gill nets decreased 40 percent and the number of traps about 3 percent, as compared with those in operation in 1934.

### CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1935 was 974, of which 780 were purse seines and 194 beach seines. The purse seines aggregated 114,300 fathoms of webbing, and the beach seines 18,452 fathoms. The number of gill nets used was 2,396, having a total length of 140,363 fathoms. There were 164 driven and 283 floating traps—a total of 447.

Southeastern Alaska was accredited with 569 seines, or a total of 89,440 fathoms, an increase of 223 seines and 31,750 fathoms of webbing over the number used in 1934; also with 359 gill nets, aggregating 28,425 fathoms, an increase of 55 nets and 7,410 fathoms of webbing; and with 30 driven and 250 floating traps, an increase of 2 driven traps, but a decrease of 12 floating traps, as compared with the number operated in 1934.

Corresponding figures for central Alaska show 397 seines, or 41,412 fathoms, as compared with 281 seines, or 30,753 fathoms, in 1934; 993 gill nets, or 67,676 fathoms, as compared with 984 gill nets, or 52,815 fathoms, in 1934; and 134 driven and 33 floating traps, as compared with 134 driven and 35 floating traps in 1934.

In western Alaska, 8 seines, or 1,900 fathoms of webbing, were used, an increase of 2 seines and 220 fathoms of webbing, as compared with the figures for 1934. There were 1,044 gill nets used, or an aggregate of 44,262 fathoms, a decrease of 1,332 nets and 116,364 fathoms of webbing. No traps were operated in this district.

Seines caught 37 percent of the salmon taken in 1935, gill nets 9 percent, and traps 52 percent, while lines and wheels took the remaining 2 percent.

*Percentage of salmon caught in each Alaska district, by principal forms of apparatus*

| Apparatus | Southeast Alaska | | Central Alaska | | Western Alaska | |
|---|---|---|---|---|---|---|
| | 1934 | 1935 | 1934 | 1935 | 1934 | 1935 |
| Seines | 29 | 32 | 33 | 47 | 5 | 10 |
| Gill nets | 1 | 3 | 7 | 7 | 94 | 81 |
| Traps | 68 | 62 | 60 | 46 | | |
| Lines | 2 | 3 | | | | |
| Wheels | | | | | 1 | 9 |

The total catch of salmon in 1935 was 73,263,804, a decrease of 43,385,268, or 37 percent, from the number taken in 1934. There was a decrease of 18,045,235 in southeast, 5,954,421 in central, and 19,385,612 in western Alaska. By species, the catch of chums increased 1,306,886 and kings 240,838, while the catch of cohos decreased 408,027, pinks 22,819,074, and reds 21,705,891.

*Salmon taken in 1935, by apparatus and species, in each geographic section of Alaska*

| Apparatus and species | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| Seines: | | | | |
| Coho, or silver | 229,041 | 55,436 | 1 | 284,478 |
| Chum, or keta | 2,919,154 | 1,384,510 | 32,342 | 4,336,006 |
| Pink, or humpback | 9,081,153 | 11,291,553 | 78 | 20,372,784 |
| King, or spring | 22,164 | 2,212 | 977 | 25,353 |
| Red, or sockeye | 429,802 | 906,757 | 416,842 | 1,753,401 |
| Total | 12,681,314 | 13,640,468 | 450,240 | 26,772,022 |
| Gill nets: | | | | |
| Coho, or silver | 244,335 | 180,361 | 9,014 | 433,710 |
| Chum, or keta | 84,311 | 204,518 | 535,065 | 823,894 |
| Pink, or humpback | 350,703 | 378,175 | 34 | 728,912 |
| King, or spring | 18,093 | 59,622 | 40,011 | 117,726 |
| Red, or sockeye | 408,081 | 1,113,442 | 3,218,014 | 4,739,537 |
| Total | 1,105,523 | 1,936,118 | 3,802,138 | 6,843,779 |
| Traps: | | | | |
| Coho, or silver | 707,554 | 302,790 | | 1,010,344 |
| Chum, or keta | 2,079,554 | 1,798,977 | | 3,878,531 |
| Pink, or humpback | 20,815,292 | 8,301,793 | | 29,117,085 |
| King, or spring | 5,697 | 35,444 | | 41,141 |
| Red, or sockeye | 1,054,851 | 2,954,321 | | 4,009,172 |
| Total | 24,662,948 | 13,393,325 | | 38,056,273 |
| Lines: | | | | |
| Coho, or silver | 578,724 | 1,440 | | 580,164 |
| Chum, or keta | 522 | | | 522 |
| Pink, or humpback | 458 | | | 458 |
| King, or spring | 595,503 | | | 595,503 |
| Red, or sockeye | 102 | | | 102 |
| Total | 1,175,309 | 1,440 | | 1,176,749 |
| Wheels: | | | | |
| Chum, or keta | | | 394,209 | 394,209 |
| King, or spring | | | 20,772 | 20,772 |
| Total | | | 414,981 | 414,981 |
| Total: | | | | |
| Coho, or silver | 1,759,654 | 540,027 | 9,015 | 2,308,696 |
| Chum, or keta | 5,083,541 | 3,388,005 | 961,616 | 9,433,162 |
| Pink, or humpback | 30,247,606 | 19,971,521 | 112 | 50,219,239 |
| King, or spring | 641,457 | 97,278 | 61,760 | 800,495 |
| Red, or sockeye | 1,892,836 | 4,974,520 | 3,634,856 | 10,502,212 |
| Grand total | 39,625,094 | 28,971,351 | 4,667,359 | 73,263,804 |

## CANNING

### CHANGES IN CANNERIES

In April 1935 the Pacific American Fisheries, Inc., purchased the properties of the Booth Salmon Co. in Alaska, formerly operated by the Northwestern Fisheries Co., which it had leased in 1933. Joint operations of the Astoria & Puget Sound Canning Co. and the Pacific American Fisheries, Inc., on Excursion Inlet were carried on at the former's plant under the name of Consolidated Fisheries. The salmon cannery that had been operated for 2 years by the Kelly Packing Co. at Ketchikan was taken over and operated by a new company, the Balcom-Payne Fisheries, Inc. The Lake Bay cannery of the Columbia River Packers Association, which has been idle since 1930, was purchased by Karl Thiele, of the Diamond K Packing Co.

A new organization, the W. R. Gilbert Co., Inc., purchased the old cannery of the Alaska Sea Food Co. at Point Whitshed that had been last operated in 1923, and rehabilitated and operated it during the season, packing both salmon and clams. The salmon and clam cannery of the Hemrich Packing Co. at Kukak Bay, which was last operated in 1932 by the Pioneer Packing Co., was acquired and operated by the new Surf Canneries, Inc. The Washington Fish & Oyster Co., Inc., purchased the cannery of the Port Williams Packing Co. at Port Williams, which it had operated on lease in 1934. The Cook Inlet Packing Co. reopened its plant at Seldovia, which had been idle for a year, and the Pacific American Fisheries, Inc., operated its Port Moller plant, which had been used in 1934 by the Herendeen Bay Consolidated Canneries.

### NEW CANNERIES

In southeast Alaska, A. R. Brueger started canning salmon, as well as continuing in the mild-curing industry and in the handling of fresh and frozen salmon and halibut. The Hydaburg Fisheries, Inc., at Hydaburg, was another new operator in this district; its equipment was installed in a building that had been erected in 1927 for use as a warehouse by the Far North Fisheries, Inc., in connection with its cannery operations on the floating plant *Pioneer*. Besides reconditioning the building and installing machinery, the company constructed a new fish house, cabins for workmen, and other accessory buildings. A new cannery building was erected by Libby, McNeill & Libby for their plant at Craig, and the equipment was transferred to it before the opening of the season, the old building then serving as a warehouse.

A salmon and clam cannery was established by Scotty's Packing Co. at Hartney Point in the building formerly used by S. E. Smith in clam-canning operations. The Alaska Icepak Corporation at Cordova, which was engaged in canning crabs only in 1934, extended its operations to include salmon and clam canning in the 1935 season. The Glacier Sea Foods Co. erected a modern shore cannery at Cordova to replace the floating plant which it had operated there, but the work was not completed in time for operation during the season. The Halibut Bay Packing Co. was formed early in 1935 to take over the plant of the Hand Packing Co. of Bert Heglund, which had been canning clams at Halibut Bay for 3 successive years. This plant prepared a small amount of hand-packed salmon in 1932, but it was

not included in the list of salmon canneries. Its chief output in 1935 was canned salmon, although a small pack of clams was also produced. A hand cannery known as the Alaska Native Cooperative Consolidated Cannery was operated by a group of natives at Sand Point Village.

CANNERIES NOT OPERATED

The plant of the Pacific American Fisheries, Inc., at Excursion Inlet was closed during the season, as its catch of salmon was packed at the cannery of the Astoria & Puget Sound Canning Co. under a cooperative arrangement.

The Cordova Fisheries Co., Inc., which entered the salmon-canning business at Cordova in 1934, canned only clams in 1935. The Glacier Sea Foods Co. did not operate its plant at Cordova, the new building to replace the floating cannery being incomplete when the season opened, and its catch was packed by the New England Fish Co. Other canneries in the central district that had operated in the previous year and were closed in 1935 were the Shepard Point Packing Co. at Shepard Point, the Seward Fisheries, Inc., at Seward, and the Ninilchik Packing Co. at Ninilchik.

Fourteen canneries that had operated in the Bristol Bay district in 1934 remained idle in 1935 because of the sharp curtailment of fishing for conservation purposes. Of these, 4 were plants of the Alaska Packers Association, 3 of Libby, McNeill & Libby, 2 of Pacific American Fisheries, Inc., 2 of Red Salmon Canning Co., and 1 each of the Alaska Salmon Co., Bristol Bay Packing Co., and the Nakat Packing Corporation.

The salmon and clam cannery of the Enterprise Seafood Co. at Ninilchik, which was idle in 1934, was reopened for packing clams only. The Blue Island Packing Co. has been dropped from the list of idle canneries, as its operations in recent years have been devoted entirely to herring. Other canneries which are no longer listed, because they have been dismantled, are as follows: Alaska Packers Association, Nushagak Bay; and Pacific American Fisheries, at Dundas Bay, Shakan, and Nushagak.

The following canneries were closed during the year but may be reopened:

| | |
|---|---|
| Southeast Alaska: | |
| Alaska Pacific Fisheries | Burnett Inlet. |
| Alaska Pacific Salmon Co | Boca de Quadra.<br>Chomly.<br>Funter Bay.<br>Pybus Bay.<br>Tenakee. |
| Alaska Packers Association | Loring.<br>Wrangell. |
| Alaska Sanitary Packing Co | Cape Fanshaw. |
| Hoonah Packing Co | Gambier Bay. |
| Icy Straits Fisheries, Inc. (floating plant) | Idaho Inlet. |
| Libby, McNeill & Libby | Klawak. |
| Nakat Packing Corporation, The | Ketchikan. |
| Pacific American Fisheries, Inc | Boca de Quadra.<br>Excursion Inlet.<br>Hunter Bay.<br>Kasaan.<br>Ketchikan.<br>Port Walter.<br>Santa Ana. |
| Karl Thiele | Lake Bay. |

| | |
|---|---|
| Central Alaska: | |
| Alaska General Fisheries | Anchorage. |
| Alaska Packers Association | Alitak.<br>Chignik.<br>Kasilof. |
| Anderson Mercantile Co., Inc | Deep Creek. |
| W. G. Culver | Point McManus. |
| Glacier Sea Foods Co | Cordova. |
| Gustan & Vogel | Point Possession. |
| Ninilchik Packing Co | Ninilchik. |
| North Coast Packing Co | Do. |
| Northern Light Packing Co | Mountain Slough. |
| Pacific American Fisheries, Inc | Bering River.<br>Chignik.<br>Kenai.<br>Orca.<br>Unakwik Inlet.<br>Uyak.<br>Valdez.<br>Zachar Bay. |
| Point Possession Fish Co | Point Possession. |
| Redoubt Bay Packing Co | Redoubt Bay. |
| E. Sandvik | Swansons Creek. |
| Seward Fisheries, Inc | Seward. |
| Shepard Point Packing Co | Shepard Point. |
| Harvey J. Smith | West Foreland. |
| Spur Fish Corporation | Nikishka Bay. |
| Sunset Packing Co | Otter Creek. |
| John Wik | Kenai. |
| Jake Young | Port Chatham. |
| Western Alaska: | |
| Alaska Packers Association | Egegik River.<br>Kvichak Bay.<br>Naknek River (2).<br>Ugashik River. |
| Alaska Salmon Co | Wood River. |
| Bristol Bay Packing Co | Kvichak Bay. |
| Columbia River Packers Association | Nushagak Bay. |
| Herendeen Bay Consolidated Canneries | Herendeen Bay. |
| Libby, McNeill & Libby | Libbyville.<br>Lockanok.<br>Nushagak. |
| Nakat Packing Corporation, The | Nakeen. |
| Pacific American Fisheries, Inc | Naknek River (2).<br>Nushagak Bay. |
| Red Salmon Canning Co | Naknek River (2).<br>Ugashik River. |

### TOTAL CANNERIES OPERATED

Ninety-nine canneries were operated in Alaska in 1935—45 in southeast, 45 in central, and 9 in western Alaska—which is an increase of 1 each for the southeast and central districts and a decrease of 13 for the western district, a net decrease of 11 plants. The floating canneries *International*, of the International Packing Co., *Memnon*, of the Columbia River Packers Association, *Santa Flavia*, of the Lowe Trading Co., and *La Merced*, of the Alaska Southern Packing Co., Inc., were operated in both central and western Alaska, and the *La Merced* also put up a pack in southeast Alaska in the fall season. Each of these plants is included but once in the total, the *International* and *La Merced* being credited to central Alaska, and the *Memnon* and *Santa Flavia* to the western district.

*Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1935*

[New canneries indicated by (*)]

| Company | Canneries | | Traps | | |
|---|---|---|---|---|---|
| | Number | Location | Driven | Floating | Total |
| Southeast Alaska: | | | | | |
| Alaska Pacific Salmon Co | 4 | Kake | 1 | 10 | 11 |
| | | Ketchikan | 3 | 7 | 10 |
| | | Port Althorp | | 18 | 18 |
| | | Rose Inlet | | 9 | 9 |
| Alaska Southern Packing Co., Inc | 1 | Todd and Cholmondeley Sound (floating). | | | |
| Annette Island Canning Co | 1 | Metlakatla | 1 | 7 | 8 |
| Balcom-Payne Fisheries, Inc | 1 | Ketchikan | | | |
| Beegle Packing Co | 1 | do | 2 | 2 | 4 |
| Berg Packing Co | 1 | Tongass Narrows (floating) | | | |
| A. R. Brueger | 1 | Wrangell * | | | |
| Consolidated Fisheries | 1 | Excursion Inlet | 1 | 12 | 13 |
| Deep Sea Salmon Co | 1 | Skowl Arm | | 7 | 7 |
| Diamond K Packing Co | 1 | Wrangell | 2 | 3 | 5 |
| Douglas Fisheries Co | 1 | Douglas | | | |
| Fidalgo Island Packing Co | 2 | Bay of Pillars | 5 | | 5 |
| | | Ketchikan | 3 | 2 | 5 |
| Haines Packing Co | 1 | Letnikof Cove | | | |
| P. E. Harris & Co | 1 | Hawk Inlet | | 7 | 7 |
| Hood Bay Canning Co | 1 | Hood Bay | | 4 | 4 |
| Hydaburg Fisheries, Inc | 1 | Hydaburg * | | | |
| Icy Straits Salmon Co | 1 | Hoonah | | | |
| Independent Salmon Canneries, Inc | 1 | Ketchikan | | 1 | 1 |
| Ketchikan Packing Co | 1 | do | | 2 | 2 |
| Klawock Packing Co | 1 | Klawak | | | |
| Lane Bros | 1 | Moira Sound | | | |
| Libby, McNeill & Libby | 4 | Craig | 1 | 8 | 9 |
| | | George Inlet | | 6 | 6 |
| | | Taku Harbor | 5 | 9 | 14 |
| | | Yakutat | | | |
| Lindenberger Packing Co | 1 | Craig | | | |
| Nakat Packing Corporation, The | 3 | Hidden Inlet | | 6 | 6 |
| | | Union Bay | | 6 | 6 |
| | | Waterfall | | 8 | 8 |
| New England Fish Co | 3 | Chatham | | 6 | 6 |
| | | Ketchikan | | 5 | 5 |
| | | Noyes Island | | 6 | 6 |
| Ocean Packing Co | 1 | Klawak | | | |
| Pacific American Fisheries, Inc | 1 | Ketchikan [1] | 3 | 13 | 16 |
| | | Petersburg | 2 | 5 | 7 |
| Peril Straits Packing Co | 1 | Todd | | 6 | 6 |
| Pyramid Packing Co., Inc | 1 | Sitka | | 4 | 4 |
| Red Salmon Packers Association | 1 | Yakutat (floating) | | | |
| Scow Bay Packing Co | 1 | Scow Bay | 1 | 1 | 2 |
| Sebastian Stuart Fish Co | 1 | Tyee | | 6 | 6 |
| Superior Packing Co | 1 | Tenakee | | 5 | 5 |
| Ward's Cove Packing Co | 1 | Ward Cove | | 4 | 4 |
| Wrangell Packing Co | 1 | Wrangell | | 3 | 3 |
| Central Alaska: | | | | | |
| Alaska General Fisheries | | Anchorage [1] | 2 | | 2 |
| Alaska Icepak Corporation | 1 | Cordova * | | | |
| Alaska Native Cooperative Consolidated Cannery. | 1 | Sand Point Village * | | | |
| Alaska Pacific Salmon Co | 2 | Drier Bay | | 4 | 4 |
| | | Sand Point | 3 | | 3 |
| Alaska Packers Association | 2 | Chignik | 2 | | 2 |
| | | Karluk | 3 | | 3 |
| Alaska Southern Packing Co | 1 | Traders Cove and Kupreanof Harbor (floating). | | | |
| Alaska Year-Round Canneries Co | 1 | Seldovia | 4 | | 4 |
| Columbia River Packers Association | 1 | Chignik [1] | 3 | | 3 |
| | | Ikatan Bay and Kupreanof Harbor (floating). | | | |
| Cook Inlet Packing Co | 1 | Seldovia | 7 | | 7 |
| Copper River Packing Co | 1 | McClure Bay | | 5 | 5 |
| Harry W. Crosby | 1 | Chignik | | | |
| Herbert T. Domenici | 1 | Uyak | | | |
| Emard Packing Co | 1 | Anchorage | 4 | | 4 |
| Fidalgo Island Packing Co | 1 | Port Graham | 8 | | 8 |
| W. R. Gilbert Co., Inc | 1 | Point Whitshed | | | |
| Glacier Sea Foods Co | | Cordova [1] | 1 | | 1 |
| Grimes Packing Co | 1 | Uzinki | | | |

[1] Traps only were operated, the fish being packed at other canneries.

*Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1935*—Continued

| Company | Canneries | | Traps | | |
|---|---|---|---|---|---|
| | Number | Location | Driven | Floating | Total |
| Halibut Bay Packing Co | 1 | Halibut Bay * | | | |
| P. E. Harris & Co | 1 | False Pass | 8 | | 8 |
| International Packing Co | 1 | Ikatan Bay and Ivanof Bay (floating). | | | |
| Kadiak Fisheries Co | 2 | Kodiak | 5 | | 5 |
| | | Shearwater Bay | | | |
| Kustatan Packing Co | 1 | Anchorage | | | |
| Libby, McNeill & Libby | 1 | Kenai | 13 | | 13 |
| Lowe Trading Co | 1 | Fox Bay (floating) | | | |
| New England Fish Co | 1 | Cordova | 4 | | 4 |
| A. N. Nilson | 1 | Portlock | | | |
| Ninilchik Packing Co | | Ninilchik [1] | 2 | | 2 |
| North Pacific Sea Foods | 1 | Fort Liscum | | | |
| Pacific American Fisheries, Inc | 3 | Alitak | 6 | | 6 |
| | | Chignik [1] | 2 | | 2 |
| | | King Cove | 14 | | 14 |
| | | Squaw Harbor | 3 | | 3 |
| Pioneer Canneries, Inc | 1 | Cordova | 2 | 1 | 3 |
| Pioneer Sea Foods Co | 1 | Eyak River | | 3 | 3 |
| Premier Salmon Co | 1 | Stevens Creek | 2 | 1 | 3 |
| Puget and Alaska Canning Co | 1 | Seldovia | | | |
| San Juan Fishing & Packing Co | 2 | Port San Juan | 2 | 2 | 4 |
| | | Uganik Bay | 4 | | 4 |
| Albert and Josie Sandvik | 1 | Uganik Village | | | |
| Scotty's Packing Co | 1 | Hartney Bay* | | | |
| Shelikof Packing Co., Inc | 1 | Zachar Bay | | | |
| Shepard Point Packing Co | 1 | Port Ashton | | 9 | 9 |
| Snug Harbor Packing Co | 1 | Snug Harbor | 4 | | 4 |
| Strand-Jensen Fisheries Co | 1 | Cordova | | | |
| Surf Canneries | 1 | Kukak Bay | | | |
| Uganik Fisheries, Inc | 1 | Uganik | 3 | | 3 |
| Washington Fish and Oyster Co., Inc | 1 | Port Williams | | | |
| Western Pacific Packing Co | 1 | Mist Harbor (floating) | | | |
| Western Alaska: | | | | | |
| Alaska Packers Association | 3 | Kvichak Bay | | | |
| | | Naknek River | | | |
| | | Nushagak Bay | | | |
| Alaska Southern Packing Co | 1 | Port Moller (floating) | | | |
| Columbia River Packers Association | 1 | Nushagak and Port Moller (floating). | | | |
| International Packing Co | 1 | Port Moller (floating) | | | |
| Libby, McNeill & Libby | 3 | Egegik River | | | |
| | | Ekuk | | | |
| | | Koggiung | | | |
| Lowe Trading Co | 1 | Nushagak River (floating) | | | |
| Pacific American Fisheries, Inc | 1 | Port Moller | | | |

[1] Traps only were operated, the fish being packed at other canneries.

### LOSSES AND DISASTERS

Reported property losses in the Alaska fisheries in 1935 amounted to $178,784, a large part of which represented the destruction of the Pioneer Sea Foods Co. cannery at the mouth of Eyak River by fire on November 29. In addition to the loss of the building and equipment, amounting to $115,000, boats valued at $35,000 that had been stored in the cannery were destroyed. A purse seine boat of the Grimes Packing Co., valued at $4,500, was burned at the dock at Uzinki as the result of an explosion in the galley range. Other losses consisted chiefly of miscellaneous small boats and fishing apparatus and amounted to $8,798 in southeast, $13,049 in central, and $2,437 in western Alaska.

Fourteen lives were lost, as follows: Four fishermen and two shoresmen were drowned, one fisherman and four shoresmen died of disease, and one fisherman and two shoresmen were killed in accidents.

### STATISTICS

Ninety-nine canneries were operated in Alaska in 1935, or 11 less than in the previous year. Employment was given to 17,529 persons, as compared with 21,654 in 1934, a decrease of 4,125. White employees decreased 1,994, Chinese 471, Japanese 362, Filipinos 605, Mexicans 703, Negroes 24, and miscellaneous (Kanakas, Koreans, Puerto Ricans, etc.) 36; while natives increased 70.

The total pack of canned salmon was 5,133,122 cases, valued at $25,768,136. This is a decrease of 31 percent both in quantity and value from the production in 1934, when the pack amounted to 7,481,830 cases, valued at $37,611,950. The output in southeast Alaska decreased from 3,295,093 cases to 3,054,038 cases, or 7 percent; in central Alaska from 2,327,418 cases to 1,802,231 cases, or about 23 percent; and in western Alaska from 1,859,319 cases to 276,853 cases, or 85 percent. By species, in Alaska as a whole, the pack of cohos decreased from 236,117 cases in 1934 to 190,177 cases in 1935, or 19 percent; pinks, from 3,824,193 cases to 3,244,066 cases, or 15 percent; kings, from 52,863 cases to 36,405 cases, or 31 percent; and reds, from 2,628,016 cases to 809,546 cases, or 69 percent; while the pack of chums increased from 740,641 cases to 852,928 cases, or 15 percent.

Details are included in the following tables to show comparison of the 1935 pack with the average for the 5 preceding years, 1930 to 1934, by cases of each species and by districts. Pink salmon and chums show gains over the 5-year average, but these gains are offset by declines in cohos, kings, and reds, especially the last. It is noteworthy, however, that the pack of red salmon was not very far below that of the corresponding cyclical year of 1930, notwithstanding the greater curtailment of commercial fishing in the Bristol Bay region. By districts, the pack in 1935 increased about 17 percent over the 5-year average in southeast Alaska and 3 percent in the central district, while in western Alaska there was a decrease of about 79 percent, making a net decrease of nearly 10 percent from the 5-year average for all of Alaska.

*Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1935*

| Items | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| PERSONS ENGAGED | | | | |
| Fishermen: | | | | |
| Whites | 1,382 | 1,501 | 432 | 3,315 |
| Natives | 1,561 | 648 | 176 | 2,385 |
| Japanese | 1 | | 3 | 4 |
| Filipinos | 55 | 2 | 2 | 59 |
| Mexicans | 3 | | | 3 |
| Miscellaneous [1] | 1 | 4 | | 5 |
| Total | 3,003 | 2,155 | 613 | 5,771 |
| Shoresmen: | | | | |
| Whites | 2,027 | 1,462 | 602 | 4,091 |
| Natives | 1,750 | 595 | 228 | 2,573 |
| Chinese | 141 | 241 | 17 | 399 |
| Japanese | 586 | 262 | 57 | 905 |
| Filipinos | 1,223 | 994 | 92 | 2,309 |
| Mexicans | 11 | 10 | | 21 |
| Negro | | | 1 | 1 |
| Miscellaneous [1] | 18 | 1 | | 19 |
| Total | 5,756 | 3,565 | 997 | 10,318 |
| Transporters: | | | | |
| Whites | 713 | 553 | 85 | 1,351 |
| Natives | 8 | 70 | 2 | 80 |
| Chinese | | 4 | | 4 |
| Japanese | 2 | 1 | | 3 |
| Filipinos | 2 | | | 2 |
| Total | 725 | 628 | 87 | 1,440 |
| Total: | | | | |
| Whites | 4,122 | 3,516 | 1,119 | 8,757 |
| Natives | 3,319 | 1,313 | 406 | 5,038 |
| Chinese | 141 | 245 | 17 | 403 |
| Japanese | 589 | 263 | 60 | 912 |
| Filipinos | 1,280 | 996 | 94 | 2,370 |
| Mexicans | 14 | 10 | | 24 |
| Negro | | | 1 | 1 |
| Miscellaneous [1] | 19 | 5 | | 24 |
| Grand total | 9,484 | 6,348 | 1,697 | 17,529 |
| Wages paid shoresmen | $1,394,365 | $1,021,258 | $304,746 | $2,720,369 |
| Wages paid transporters | 376,756 | 299,573 | 42,336 | 718,665 |
| OPERATING UNITS | | | | |
| Plants: | | | | |
| Shore canneries | 43 | 42 | 7 | 92 |
| Floating canneries— | | | | |
| Power vessels | 1 | 2 | 2 | 5 |
| Net tonnage | 245 | 3,698 | 3,575 | 7,518 |
| Barges | 1 | 1 | | 2 |
| Net tonnage | 1,092 | 494 | | 1,586 |
| Total plants operated | 45 | 45 | 9 | 99 |
| Vessels: | | | | |
| Power, over 5 tons | 544 | 188 | 29 | 761 |
| Net tonnage | 9,740 | 5,740 | 4,217 | 19,697 |
| Launches | 257 | 197 | 11 | 465 |
| Power dories | 25 | 41 | 7 | 73 |
| Gill-net boats | 136 | 162 | 215 | 513 |
| Seine skiffs | 313 | 191 | 5 | 509 |
| Other rowboats and skiffs | 712 | 541 | 100 | 1,353 |
| Lighters and scows | 196 | 187 | 33 | 416 |
| Houseboats | 16 | 3 | 5 | 24 |
| Pile drivers | 24 | 27 | 3 | 54 |
| Pile pullers | 3 | 5 | | 8 |
| Rigging scows | 35 | 11 | | 46 |
| Apparatus: | | | | |
| Purse seines | 563 | 209 | 8 | 780 |
| Fathoms | 88,840 | 23,560 | 1,900 | 114,300 |
| Beach seines | 6 | 165 | | 171 |
| Fathoms | 600 | 16,267 | | 16,867 |
| Gill nets | 340 | 961 | 515 | 1,816 |
| Fathoms | 27,775 | 66,066 | 32,958 | 126,799 |
| Traps, driven | 30 | 134 | | 164 |
| Traps, floating | 250 | 33 | | 283 |

[1] Kanakas, Koreans, Puerto Ricans, etc.

*Output and value of canned salmon in Alaska in 1935* [1]

| Product | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Cases | Value | Cases | Value | Cases | Value | Cases | Value |
| Coho, or silver: | | | | | | | | |
| ½-pound flat | 4, 808 | $46, 208 | 2, 014 | $17, 306 | -------- | --------- | 6, 822 | $63, 514 |
| 1-pound flat | 2, 094 | 15, 055 | 739 | 5, 173 | -------- | --------- | 2, 833 | 20, 228 |
| 1-pound tall | 135, 591 | 855, 526 | 44, 708 | 276, 555 | 223 | $1, 411 | 180, 522 | 1, 133, 492 |
| Total | 142, 493 | 916, 789 | 47, 461 | 299, 034 | 223 | 1, 411 | 190, 177 | 1, 217, 234 |
| Chum, or keta: | | | | | | | | |
| ½-pound flat | 1, 006 | 6, 036 | 641 | 3, 666 | -------- | --------- | 1, 647 | 9, 702 |
| 1-pound tall | 539, 942 | 2, 053, 905 | 301, 482 | 1, 166, 752 | 9, 857 | 38, 712 | 851, 281 | 3, 259, 369 |
| Total | 540, 948 | 2, 059, 941 | 302, 123 | 1, 170, 418 | 9, 857 | 38, 712 | 852, 928 | 3, 269, 071 |
| Pink, or humpback: | | | | | | | | |
| ½-pound flat | 34, 576 | 222, 654 | 9, 984 | 62, 789 | -------- | --------- | 44, 560 | 285, 443 |
| 1-pound flat | 687 | 2, 748 | -------- | --------- | -------- | --------- | 687 | 2, 748 |
| 1-pound tall | 2, 164, 797 | 9, 037, 864 | 1, 034, 018 | 4, 094, 392 | 4 | 15 | 3, 198, 819 | 13, 132, 271 |
| Total | 2, 200, 060 | 9, 263, 266 | 1, 044, 002 | 4, 157, 181 | 4 | 15 | 3, 244, 066 | 13, 420, 462 |
| King, or spring: | | | | | | | | |
| ½-pound flat | 4, 969 | 64, 075 | 8, 493 | 72, 240 | -------- | --------- | 13, 462 | 136, 315 |
| 1-pound flat | 2, 081 | 21, 289 | 4, 379 | 41, 435 | 60 | 564 | 6, 520 | 63, 288 |
| 1-pound tall | 4, 058 | 28, 138 | 11, 590 | 83, 071 | 775 | 5, 907 | 16, 423 | 117, 116 |
| Total | 11, 108 | 113, 502 | 24, 462 | 196, 746 | 835 | 6, 471 | 36, 405 | 316, 719 |
| Red, or sockeye: | | | | | | | | |
| ½-pound flat | 29, 560 | 381, 892 | 57, 306 | 723, 278 | 632 | 7, 813 | 87, 498 | 1, 112, 983 |
| 1-pound flat | 12, 505 | 121, 515 | 45, 188 | 451, 610 | -------- | --------- | 57, 693 | 573, 125 |
| 1-pound tall | 117, 364 | 1, 053, 878 | 281, 689 | 2, 432, 751 | 265, 302 | 2, 371, 913 | 664, 355 | 5, 858, 542 |
| Total | 159, 429 | 1, 557, 285 | 384, 183 | 3, 607, 639 | 265, 934 | 2, 379, 726 | 809, 546 | 7, 544, 650 |
| Grand total | 3, 054, 038 | 13, 910, 783 | 1, 802, 231 | 9, 431, 018 | 276, 853 | 2, 426, 335 | 5, 133, 122 | 25, 768, 136 |

[1] Cases containing ½-pound cans have been reduced one-half in number, and thus, for the purpose of affording fair comparison, all are put upon the basis of 48 1-pound cans to the case.

*Output of canned salmon in Alaska, in cases, 1930 to 1935* [1]

BY SPECIES

| Product | 1930 | 1931 | 1932 | 1933 | 1934 | Average for 5-year period, 1930–34 | 1935 | Percentage increase or decrease in 1935, as compared with 5-year average |
|---|---|---|---|---|---|---|---|---|
| Coho, or silver: | | | | | | | | |
| ¼-pound flat | 371 | | | | | 74 | | −100.00 |
| ½-pound flat | 18,808 | 9,962 | 3,442 | 3,367 | 5,785 | 8,273 | 6,822 | −17.54 |
| 1-pound flat | 5,926 | 2,902 | 1,763 | 4,657 | 8,283 | 4,706 | 2,833 | −39.80 |
| 1-pound tall | 307,317 | 157,014 | 142,970 | 154,544 | 222,049 | 196,779 | 180,522 | −8.26 |
| Total | 332,422 | 169,878 | 148,175 | 162,568 | 236,117 | 209,832 | 190,177 | −9.37 |
| Chum, or keta: | | | | | | | | |
| ½-pound flat | 8,384 | 4,242 | 624 | 658 | 2,298 | 3,241 | 1,647 | −49.18 |
| 1-pound flat | | 35 | | | | 7 | | −100.00 |
| 1-pound tall | 591,550 | 529,579 | 819,932 | 658,131 | 738,343 | 667,507 | 851,281 | +27.53 |
| Total | 599,934 | 533,856 | 820,556 | 658,789 | 740,641 | 670,755 | 852,928 | +27.16 |
| Pink, or humpback: | | | | | | | | |
| ¼-pound flat | 1,113 | | | | | 222 | | −100.00 |
| ½-pound flat | 81,064 | 46,524 | 7,166 | 14,857 | 28,793 | 35,681 | 44,560 | +24.88 |
| 1-pound flat | 4,867 | 4,410 | | | 1,668 | 2,189 | 687 | −68.62 |
| 1-pound tall | 3,101,490 | 2,902,926 | 2,105,979 | 2,167,694 | 3,793,732 | 2,814,364 | 3,198,819 | +13.66 |
| Total | 3,188,534 | 2,953,860 | 2,113,145 | 2,182,551 | 3,824,193 | 2,852,456 | 3,244,066 | +13.73 |
| King, or spring: | | | | | | | | |
| ½-pound flat | 17,840 | 13,208 | 11,713 | 9,955 | 9,983 | 12,540 | 13,462 | +7.35 |
| 1-pound flat | 23,686 | 16,721 | 14,800 | 10,021 | 10,214 | 15,088 | 6,520 | −56.79 |
| 1-pound tall | 18,396 | 21,938 | 43,013 | 21,437 | 32,666 | 27,490 | 16,423 | −40.26 |
| Total | 59,922 | 51,867 | 69,526 | 41,413 | 52,863 | 55,118 | 36,405 | −33.95 |
| Red, or sockeye: | | | | | | | | |
| ¼-pound flat | 370 | | | | | 74 | | −100.00 |
| ½-pound flat | 110,605 | 58,178 | 47,707 | 53,638 | 88,051 | 71,636 | 87,498 | +22.14 |
| 1-pound flat | 62,972 | 41,002 | 75,524 | 60,052 | 73,430 | 62,596 | 57,693 | −7.83 |
| 1-pound tall | 677,567 | 1,595,098 | 1,979,850 | 2,066,593 | 2,466,535 | 1,757,129 | 664,355 | −62.19 |
| Total | 851,514 | 1,694,278 | 2,103,081 | 2,180,283 | 2,628,016 | 1,891,435 | 809,546 | −57.20 |
| Grand total | 5,032,326 | 5,403,739 | 5,254,483 | 5,225,604 | 7,481,830 | 5,679,596 | 5,133,122 | −9.62 |

BY DISTRICTS AND SPECIES

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Southeast Alaska: | | | | | | | | |
| Coho, or silver | 155,652 | 88,455 | 87,038 | 95,805 | 158,527 | 117,095 | 142,493 | +21.69 |
| Chum, or keta | 283,478 | 274,248 | 579,443 | 424,861 | 394,212 | 391,248 | 540,948 | +38.26 |
| Pink, or humpback | 2,309,976 | 2,013,442 | 1,379,606 | 1,478,013 | 2,622,362 | 1,960,560 | 2,200,060 | +12.22 |
| King, or spring | 6,939 | 14,896 | 23,624 | 8,146 | 15,594 | 13,840 | 11,108 | −19.74 |
| Red, or sockeye | 221,241 | 147,895 | 138,942 | 81,126 | 104,398 | 138,720 | 159,429 | +14.93 |
| Total | 2,977,286 | 2,538,936 | 2,208,053 | 2,087,951 | 3,295,093 | 2,621,463 | 3,054,038 | +16.50 |
| Central Alaska: | | | | | | | | |
| Coho, or silver | 173,352 | 81,331 | 60,674 | 65,307 | 76,371 | 91,407 | 47,461 | −48.08 |
| Chum, or keta | 284,751 | 193,053 | 147,410 | 207,879 | 313,233 | 229,265 | 302,123 | +31.78 |
| Pink, or humpback | 859,761 | 940,418 | 724,051 | 704,538 | 1,199,872 | 885,728 | 1,044,002 | +17.87 |
| King, or spring | 32,060 | 27,599 | 32,302 | 23,786 | 28,472 | 28,844 | 24,462 | −15.19 |
| Red, or sockeye | 268,621 | 439,153 | 660,161 | 484,484 | 709,470 | 512,378 | 384,183 | −25.02 |
| Total | 1,618,545 | 1,681,554 | 1,624,598 | 1,485,994 | 2,327,418 | 1,747,622 | 1,802,231 | +3.12 |
| Western Alaska: | | | | | | | | |
| Coho, or silver | 3,418 | 92 | 463 | 1,456 | 1,219 | 1,330 | 223 | −83.23 |
| Chum, or keta | 31,705 | 66,555 | 93,703 | 26,049 | 33,196 | 50,242 | 9,857 | −80.38 |
| Pink, or humpback | 18,797 | | 10,088 | | 1,959 | 6,169 | 4 | −99.94 |
| King, or spring | 20,923 | 9,372 | 13,600 | 9,481 | 8,797 | 12,434 | 835 | −93.28 |
| Red, or sockeye | 361,652 | 1,107,230 | 1,303,978 | 1,614,673 | 1,814,148 | 1,240,336 | 265,934 | −78.56 |
| Total | 436,495 | 1,183,249 | 1,421,832 | 1,651,659 | 1,859,319 | 1,310,511 | 276,853 | −78.87 |
| Grand total | 5,032,326 | 5,403,739 | 5,254,483 | 5,225,604 | 7,481,830 | 5,679,596 | 5,133,122 | −9.62 |

[1] The number of cases shown has been put upon the common basis of forty-eight 1-pound cans per case.

*Relative importance of each species of canned salmon within each district in 1935*

| District | Coho | Chum | Pink | King | Red | Total, all species |
|---|---|---|---|---|---|---|
| | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* |
| Southeast Alaska | 4.7 | 17.7 | 72.0 | 0.4 | 5.2 | 100.0 |
| Central Alaska | 2.6 | 16.8 | 57.9 | 1.4 | 21.3 | 100.0 |
| Western Alaska | .1 | 3.6 | .0 | .3 | 96.0 | 100.0 |
| All Alaska | 3.7 | 16.6 | 63.2 | .7 | 15.8 | 100.0 |

*Relative importance of each district in the production of each species of salmon canned in 1935*

| District | Coho | Chum | Pink | King | Red | Total, all species |
|---|---|---|---|---|---|---|
| | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* |
| Southeast Alaska | 74.9 | 63.4 | 67.8 | 30.5 | 19.7 | 59.5 |
| Central Alaska | 25.0 | 35.4 | 32.2 | 67.2 | 47.5 | 35.1 |
| Western Alaska | .1 | 1.2 | .0 | 2.3 | 32.8 | 5.4 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Average annual price per case of 48 1-pound cans of salmon, 1925–35*

| Product | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Coho or silver | $9.72 | $8.40 | $8.51 | $7.12 | $7.59 | $8.26 | $6.51 | $4.12 | $5.20 | $5.23 | $6.40 |
| Chum or keta | 4.44 | 5.01 | 5.47 | 6.06 | 5.35 | 3.60 | 3.19 | 2.79 | 4.12 | 3.65 | 3.83 |
| Pink or humpback | 5.28 | 5.39 | 5.87 | 6.56 | 6.07 | 4.17 | 3.46 | 3.14 | 4.52 | 4.10 | 4.14 |
| King or spring | 11.91 | 10.37 | 11.25 | 11.13 | 11.92 | 13.32 | 9.40 | 5.46 | 7.51 | 6.85 | 8.70 |
| Red or sockeye | 13.12 | 9.89 | 12.08 | 9.41 | 10.71 | 12.57 | 9.20 | 5.61 | 6.71 | 6.72 | 9.32 |

## PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1934. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

### WESTERN ALASKA

*Bristol Bay.*—The Bering Sea shore, east and north of the Ugashik River.

*Port Moller and Herendeen Bay.*—Port Moller, Herendeen Bay, and Nelson Lagoon.

### CENTRAL ALASKA

*Ikatan-Shumagin Islands.*—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.

*Chignik.*—Canneries located at Chignik.

*Kodiak-Afognak Islands.*—Kodiak, Spruce, and Raspberry Islands.

*Cook Inlet.*—The shores of Cook Inlet.

*Prince William Sound.*—Resurrection Bay to Point Whitshed.

*Copper and Bering Rivers.*—Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

*Yakutat and Dry Bay.*—Yakutat Bay to and including Dry Bay.

*Icy Strait-Lynn Canal.*—West coast of Baranof and Chichagof islands, the shores of Cross Sound, Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.

*Chatham Strait-Frederick Sound.*—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.

*Sumner Strait-Dixon Entrance.*—Southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance, and including all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.

*West coast, Prince of Wales Island.*—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

*Pack of canned salmon in Alaska in 1935, by districts* [1]

| District | Coho | Chum | Pink | King | Red | Total | Percentage increase or decrease from 1934 |
|---|---|---|---|---|---|---|---|
| | *Cases* | *Cases* | *Cases* | *Cases* | *Cases* | *Cases* | |
| Bristol Bay | 223 | 6,995 | -------- | 660 | 231,014 | 238,892 | −86.51 |
| Port Moller and Herendeen Bay | -------- | 2,862 | 4 | 175 | 34,920 | 37,961 | −57.14 |
| Ikatan-Shumagin Islands | 11,297 | 175,340 | 266,144 | 3,741 | 74,412 | 530,934 | −24.00 |
| Chignik | 1,611 | 17,027 | 19,504 | 127 | 60,808 | 99,077 | −40.59 |
| Kodiak-Afognak Islands | 6,753 | 42,130 | 534,083 | 350 | 119,720 | 703,036 | +7.22 |
| Cook Inlet | 14,977 | 14,400 | 22,506 | 18,863 | 104,694 | 175,440 | −31.69 |
| Prince William Sound | 3,447 | 53,226 | 201,756 | 621 | 16,096 | 275,146 | −39.26 |
| Copper and Bering Rivers | 9,376 | -------- | 9 | 760 | 8,453 | 18,598 | −80.72 |
| Yakutat and Dry Bay | 15,766 | 148 | 4,966 | 2,081 | 20,006 | 42,967 | −27.73 |
| Icy Strait-Lynn Canal | 16,152 | 76,562 | 185,700 | 2,707 | 60,601 | 341,722 | −30.71 |
| Chatham Strait-Frederick Sound | 16,585 | 154,018 | 335,735 | 5,801 | 9,759 | 521,898 | −21.65 |
| Sumner Strait-Dixon Entrance | 56,474 | 202,963 | 1,406,122 | 519 | 58,324 | 1,724,402 | +19.47 |
| West coast, Prince of Wales Island | 37,516 | 107,257 | 267,537 | -------- | 10,739 | 423,049 | −33.17 |
| Total | 190,177 | 852,928 | 3,244,066 | 36,405 | 809,546 | 5,133,122 | −31.39 |

[1] Pack reduced to the basis of forty-eight 1-pound cans per case.

## MILD CURING

The output of mild-cured salmon in 1935 showed a substantial increase over that of the preceding year and was the largest since 1930. As usual, the bulk of the product was put up in southeast Alaska. In the western district operations were again carried on at the mouth of the Yukon River, but the commercial catch there was exceptionally light. Small outputs were prepared also on the Kuskokwim River and at Cordova.

The usual registration of trolling boats in southeast Alaska was not undertaken by the Bureau in 1935. It was estimated, however, that the number operated was 10 percent more than in the preceding year.

Twenty-four plants were engaged in the industry, and 1,465 persons were employed, as compared with 22 plants and 1,281 persons in 1934.

The total production of mild-cured salmon was 4,442,400 pounds, valued at $873,693, an increase of 909,600 pounds in quantity and $257,582 in value over the previous year.

*Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1935*

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| PERSONS ENGAGED | | | | |
| Fishermen: | | | | |
| Whites | 991 | 1 | 1 | 993 |
| Natives | 153 | 2 | 21 | 176 |
| Chinese | 2 | | | 2 |
| Filipinos | 12 | | | 12 |
| Mexicans | 2 | | | 2 |
| Total | 1,160 | 3 | 22 | 1,185 |
| Shoresmen: | | | | |
| Whites | 175 | | 3 | 178 |
| Natives | 4 | 2 | 27 | 33 |
| Total | 179 | 2 | 30 | 211 |
| Transporters: | | | | |
| Whites | 66 | | 1 | 67 |
| Natives | | | 2 | 2 |
| Total | 66 | | 3 | 69 |
| Grand total | 1,405 | 5 | 55 | 1,465 |
| Wages paid shoresmen | $86,223 | $190 | $3,310 | $89,723 |
| Wages paid transporters | $27,003 | | $404 | $27,407 |
| OPERATING UNITS | | | | |
| Plants: | | | | |
| Shore | 16 | | 4 | 20 |
| Floating— | | | | |
| Power vessel | | 1 | | 1 |
| Net tonnage | | 14 | | 14 |
| Barges | 3 | | | 3 |
| Net tonnage | 720 | | | 720 |
| Total plants operated | 19 | 1 | 4 | 24 |
| Vessels: | | | | |
| Power, over 5 tons | 241 | | 3 | 244 |
| Net tonnage | 2,031 | | 68 | 2,099 |
| Launches | 610 | 1 | | 611 |
| Power dories | | | 2 | 2 |
| Gill-net boats | | | 6 | 6 |
| Rowboats and skiffs | 116 | 2 | 6 | 124 |
| Lighters and scows | 12 | 1 | 3 | 16 |
| Houseboat | 1 | | | 1 |
| Apparatus: | | | | |
| Gill nets | | 2 | 21 | 23 |
| Fathoms | | 400 | 910 | 1,310 |
| Lines | 3,523 | | | 3,523 |
| Wheels | | | 4 | 4 |

*Products of Alaska salmon mild-curing industry in 1935*

| Products | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Pounds | Value | Pounds | Value | Pounds | Value | Pounds | Value |
| Coho, or silver | [1] 293,600 | $32,478 | [2] 8,000 | $820 | | | [3] 301,600 | $33,298 |
| Chum, or keta | 38,400 | 2,347 | | | | | [4] 38,400 | 2,347 |
| King, or spring | [5] 3,976,000 | 822,778 | [6] 12,000 | 1,550 | [7] 114,400 | $13,720 | [8] 4,102,400 | 838,048 |
| Total | 4,308,000 | 857,603 | 20,000 | 2,370 | 114,400 | 13,720 | 4,442,400 | 873,693 |

[1] 367 tierces.
[2] 10 tierces.
[3] 377 tierces.
[4] 48 tierces.
[5] 4,970 tierces.
[6] 15 tierces.
[7] 143 tierces.
[8] 5,128 tierces.

## PICKLING

Operations in the salmon-pickling industry since 1930 have been marked by a striking variation between the odd and even years. This continued in 1935, when the production was more than double that for 1934, although it fell somewhat short of the quantity reported for other recent odd years.

In the western district, which produced about 60 percent of the total output, operations were carried on by five plants in the Bristol Bay area, of which two were primarily engaged in the canning industry. In addition, the floating plant *Anvil*, of the Davis Fisheries, Inc., packed salt salmon at the mouth of the Kuskokwim River, and there was a small production on the Yukon River and at Dutch Harbor. A considerable number of small plants again operated in the central district, chiefly off the south coast of the Alaska Peninsula from Sanak Island to Kodiak Island, and on Cook Inlet and Prince William Sound. Some pickled salmon was also put up in southeast Alaska.

One hundred and twenty-three persons were employed in the industry—an increase of 92 over the number reported for the previous year. The total output was 896,175 pounds, valued at $95,158, as compared with 387,450 pounds valued at $28,987 in 1934.

*Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1935*

| Items | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| PERSONS ENGAGED | | | | |
| Fishermen: | | | | |
| Whites | 3 | 34 | 23 | 60 |
| Natives | | 8 | 2 | 10 |
| Total | 3 | 42 | 25 | 70 |
| Shoremen: | | | | |
| Whites | | 2 | 38 | 40 |
| Natives | | 3 | 10 | 13 |
| Total | | 5 | 48 | 53 |
| Grand total | 3 | 47 | 73 | 123 |
| Wages paid shoresmen | | $969 | $22,642 | $23,611 |
| OPERATING UNITS | | | | |
| Plants: | | | | |
| Shore | 2 | 23 | 3 | 28 |
| Floating— | | | | |
| Power vessels | | 1 | 1 | 2 |
| Net tonnage | | 14 | 276 | 290 |
| Total plants operated | 2 | 24 | 4 | 30 |
| Vessels: | | | | |
| Power, over 5 tons | 3 | 2 | | 5 |
| Net tonnage | 24 | 17 | | 41 |
| Launches | | 7 | 1 | 8 |
| Power dories | | 11 | | 11 |
| Gill-net boats | 4 | 2 | 8 | 14 |
| Seine skiffs | | 19 | | 19 |
| Rowboats and skiffs | | 19 | 3 | 22 |
| Lighters and scows | 1 | 3 | | 4 |
| Houseboat | | 1 | | 1 |
| Apparatus: | | | | |
| Beach seines | | 22 | | 22 |
| Fathoms | | 1,495 | | 1,495 |
| Gill nets | 9 | 23 | 24 | 56 |
| Fathoms | 300 | 660 | 2,725 | 3,685 |
| Lines | | 2 | | 2 |

*Products of Alaska salmon-pickling industry in 1935*

| Products | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Pounds | Value | Pounds | Value | Pounds | Value | Pounds | Value |
| Coho, or silver | 41,600 | $4,010 | 143,100 | $13,479 | 48,800 | $5,368 | 233,500 | $22,857 |
| Chum, or keta | | | 1,900 | 290 | 5,500 | 480 | 7,400 | 770 |
| King, or spring | | | 17,000 | 3,266 | 104,875 | 9,882 | 121,875 | 13,148 |
| Red, or sockeye | 7,600 | 898 | 150,800 | 18,797 | 375,000 | 38,688 | 533,400 | 58,383 |
| Total | 49,200 | 4,908 | 312,800 | 35,832 | 534,175 | 54,418 | 896,175 | 95,158 |

## FRESH SALMON

Sixteen plants in southeast Alaska and 1 in the central district reported an output of fresh salmon incidental to other fishery operations. The total products amounted to 2,951,636 pounds, valued at $168,427, as compared with 1,385,789 pounds valued at $69,837 in 1934—an increase of 113 percent in quantity and 141 percent in value. These figures do not include salmon for fox feed, which is shown under miscellaneous salmon products.

*Products of the Alaska fresh-salmon industry in 1935*

| Species | Pounds | Value |
|---|---|---|
| Coho, or silver | 688,008 | $35,342 |
| King, or spring | 2,262,959 | 133,042 |
| Red, or sockeye | 669 | 43 |
| Total | 2,951,636 | 168,427 |

## FREEZING

The freezing of salmon in Alaska was carried on only in the southeastern district, primarily in conjunction with the mild-curing industry. One cold-storage plant whose chief product was frozen salmon gave employment to 17 white shoresmen. The total output was 4,266,834 pounds, valued at $270,178, as compared with 5,316,574 pounds valued at $334,812 in 1934—a decrease of about 20 percent in quantity and 19 percent in value.

Salmon that were frozen for use as bait in the halibut fishery are not included in the above figures but are shown under miscellaneous salmon products.

*Products of the Alaska frozen-salmon industry in 1935*

| Species | Pounds | Value |
|---|---|---|
| Coho, or silver | 2,086,540 | $116,162 |
| Chum, or keta | 237,978 | 4,917 |
| Pink, or humpback | 26,350 | 791 |
| King, or spring | 1,915,966 | 148,308 |
| Total | 4,266,834 | 270,178 |

## DRY-SALTED, DRIED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

Three operators in southeast Alaska and one in the central district reported the dry-salting of salmon, the total production amounting to 59,900 pounds valued at $6,433. Five white fishermen and one white shoresman were employed in these operations. Other miscellaneous products in these districts, incidental to salmon canning and mild-curing for the most part, consisted of 45 cases of smoked and canned king salmon valued at $225; 17,000 pounds of caviar valued at $2,100; 240,930 pounds of frozen salmon for use as bait in the halibut fishery, valued at $1,205; and 8,400 pounds of fresh salmon for fox feed, valued at $42.

In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 1,436,000 pounds of chum salmon were dried, valued at $114,960. Fifteen whites and six hundred and fifty natives engaged in the fishery, and the apparatus used consisted of 293 wheels, 484 gill nets of 7,669 fathoms, 2 dories, and 50 rowboats and skiffs.

*Production of dry-salted, dried, and other miscellaneous salmon products in Alaska in 1935*

| Products | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Pounds | Value | Pounds | Value | Pounds | Value | Pounds | Value |
| Dry-salted: | | | | | | | | |
| Coho, or silver | 12,300 | $1,276 | 21,800 | $1,962 | | | 34,100 | $3,238 |
| King, or spring | 2,000 | 220 | | | | | 2,000 | 220 |
| Red, or sockeye | 23,800 | 2,975 | | | | | 23,800 | 2,975 |
| Total | 38,100 | 4,471 | 21,800 | 1,962 | | | 59,900 | 6,433 |
| Dried: Chum or keta | | | | | 1,436,000 | $114,960 | 1,436,000 | 114,960 |
| Smoked and canned: King, or spring | 1,080 | 225 | | | | | 1,080 | 225 |
| Frozen for bait: Chum, or keta | 240,930 | 1,205 | | | | | 240,930 | 1,205 |
| Fresh for fox feed: Pink, or humpback | | | 8,400 | 42 | | | 8,400 | 42 |
| Caviar | 17,000 | 2,100 | | | | | 17,000 | 2,100 |
| Grand total | 297,110 | 8,001 | 30,200 | 2,004 | 1,436,000 | 114,960 | 1,763,310 | 124,965 |

## BYPRODUCTS

The manufacture of salmon meal and oil was carried on by a byproducts plant in southeast Alaska that gave employment to 14 white shoremen and 2 white transporters, and by a salmon cannery in the central district as an adjunct to its canning operations. The total production was 1,171,900 pounds of fertilizer, valued at $16,763, and 49,000 gallons of oil, valued at $15,200, as compared with 1,015,560 pounds of fertilizer valued at $15,233 and 33,720 gallons of oil valued at $13,701 in 1934—an increase of 15 percent in the output of fertilizer and 45 percent in the amount of oil.

## HERRING

A new peak was reached in 1935 in the volume of Alaska herring products, the total amounting to 81,147,693 pounds, as compared with the previous record output of 77,064,011 pounds in 1925. In the

intervening decade there had been, notwithstanding some marked fluctuations, a general upward trend in the production of meal and oil. This upward trend was continued in 1935, chiefly through the establishment of reduction plants for the first time in the Kodiak area to enable the utilization of that portion of the catch consisting of fish too small for satisfactory curing.

The total output of Scotch-cured herring in 1935, although far short of the 1925 production, was the largest for any year since 1928 and more than double that of 1934. All the major districts contributed to the gain, but the chief increase was in the Prince William Sound and Kodiak areas. In southeast Alaska 2,187,000 pounds of Scotch-cured herring were produced, as compared with 2,137,075 pounds in the preceding year. The increase in the Prince William Sound area was from 1,790,750 pounds in 1934 to 5,626,500 pounds in 1935, in the Kodiak area from 1,455,875 pounds to 3,696,950 pounds, and in the Aleutian Islands region from 2,015,375 pounds to 3,404,675 pounds. Small quantities of cured herring were prepared at Cook Inlet, Chignik, and Golovin Bay.

Of the 24 concerns that handled herring in southeast Alaska, 6 were cold-storage plants that froze herring for bait and 8 were engaged solely in the production of bait herring. The following companies operated saltery and reduction plants in this district:

| | |
|---|---|
| Arentsen & Co | Big Port Walter. |
| Atlas Packing Corporation | Deep Cove. |
| Buchan & Heinen Packing Co | Port Armstrong. |
| Chatham Strait Fish Co | New Port Walter. |
| Northwestern Herring Co | Port Conclusion. |
| Port Herbert Packing Co | Port Herbert. |
| Richmond Fisheries, Inc | Red Bluff Bay. |
| Storfold & Grondahl Packing Co | Washington Bay. |

In central Alaska two floating salteries—the *Donna Lane* of the Oceanic Fisheries Co., Inc., and a scow of the Patmos Packing Co.—were used in both the Prince William Sound and Kodiak areas. The Southwestern Herring Co. leased the plant at Iron Creek that had been operated in 1934 by the Apex Fish Co., and the latter built a new plant at Port Wakefield, 3 miles east of Iron Creek, on Raspberry Island. The output of bait in the Kodiak region was the smallest since 1930, attributable to a disappointing early run in Uganik Bay. The more important operators in the central district were as follows:

| | |
|---|---|
| Salteries: | |
| David Buvick | Shuyak Strait. |
| Oceanic Fisheries Co., Inc | Floating plant. |
| Patmos Packing Co | Do. |
| San Marco Fish Co | Amee Bay and floating plant. |
| Sword & Hofstad | Floating plant. |
| Saltery and reduction plants: | |
| Apex Fish Co | Port Wakefield. |
| Chatham Strait Fish Co | Crab Bay. |
| Evans Bay Packing Co., Inc | Port Benny. |
| George Hogg & Co | Blue Fox Bay. |
| Johnson Fisheries Co | Thumb Bay. |
| Perfection Fisheries, Inc | Do. |
| San Juan Fishing & Packing Co | Port San Juan. |
| Shepard Point Packing Co | Port Ashton. |
| Southwestern Herring, Inc | Iron Creek. |

With the exception of a small production at Golovin Bay, all herring packing in the western district was at Dutch Harbor and Unalaska, the operators generally being the same as in the preceding year. The Davis Fisheries, Inc., which was engaged primarily in mild-curing salmon off the mouth of the Kuskokwim River, prepared dry-salted herring aboard the floating plant *Anvil* at Dutch Harbor. Other important operators in the district were as follows, all of whom packed Scotch-cured herring, while many put up bloater stock or dry-salted herring also:

| | |
|---|---|
| Austnes & Rod | Unalaska. |
| Campbell & Dougal | Dutch Harbor. |
| Odin Isaacson | Unalaska. |
| Ed Jacobsen & Co | Dutch Harbor. |
| Jordan Colombos Lambides | Do. |
| Northwestern Herring Co | Do. |
| Olaf Olsen | Unalaska. |
| Peterson & Jorgensen | Dutch Harbor. |
| Polar Packing Co | Unalaska. |
| T. A. Roth | Do. |

Studies concerning the life history and fluctuations in the abundance of the herring populations in Alaska were continued by Edwin H. Dahlgren, chiefly in the Chatham Strait fishing area. New developments in the tagging of herring for the purpose of tracing their migrations have made possible the partial determination of the mortality of this species as affected by natural conditions as well as the drain of the fishery.

## STATISTICAL SUMMARY

There were 1,339 persons engaged in the herring industry in 1935, as compared with 885 in 1934. The number of plants increased from 26 to 32. Products of the fishery were valued at $2,374,092, an increase of $771,068, or 48 percent over 1934, when the total value was $1,603,024. Scotch-cured herring increased from 7,409,200 pounds valued at $445,476 to 14,942,750 pounds valued at $808,064, or about 102 percent in quantity and 81 percent in value. Herring for bait decreased from 6,391,950 pounds valued at $52,259 to 5,959,475 pounds valued at $50,512, or 7 percent in quantity and 3 percent in value. Meal increased about 8 percent in quantity but decreased 19 percent in value, and oil increased 2 percent in quantity and 76 percent in value.

*Persons engaged, wages paid, and operating units, Alaska herring industry, 1935*

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| PERSONS ENGAGED | | | | |
| Fishermen: | | | | |
| Whites | 354 | 196 | 25 | 575 |
| Natives | | 3 | 4 | 7 |
| Total | 354 | 199 | 29 | 582 |
| Shoresmen: | | | | |
| Whites | 277 | 352 | 57 | 686 |
| Natives | | 26 | 29 | 55 |
| Total | 277 | 378 | 86 | 741 |
| Transporters: | | | | |
| Whites | | 14 | 2 | 16 |
| Grand total | 631 | 591 | 117 | 1,339 |
| Wages paid shoresmen | $113,102 | $161,073 | $29,984 | $304,159 |
| Wages paid transporters | | $7,397 | $560 | $7,957 |
| OPERATING UNITS | | | | |
| Plants: | | | | |
| Shore | 8 | 9 | 11 | 28 |
| Floating— | | | | |
| Power vessel | | 1 | | 1 |
| Net tonnage | | 1,597 | | 1,597 |
| Sailing vessel | | 1 | | 1 |
| Net tonnage | | 1,068 | | 1,068 |
| Scows | | 2 | | 2 |
| Total plants operated | 8 | 13 | 11 | 32 |
| Vessels: | | | | |
| Power, over 5 tons | 51 | 32 | | 83 |
| Net tonnage | 1,701 | 944 | | 2,645 |
| Launches | 3 | 2 | 3 | 8 |
| Power dories | | | 6 | 6 |
| Gill-net boats | | | 7 | 7 |
| Seine skiffs | 24 | 19 | | 43 |
| Other rowboats and skiffs | 20 | 10 | 6 | 36 |
| Scow | 1 | | | 1 |
| Pile drivers | | 2 | | 2 |
| Apparatus: | | | | |
| Purse seines | 54 | 26 | | 80 |
| Fathoms | 8,907 | 4,400 | | 13,307 |
| Beach seines | | 2 | | 2 |
| Fathoms | | 90 | | 90 |
| Gill nets | | | 34 | 34 |
| Fathoms | | | 1,510 | 1,510 |
| Pound seines | 11 | 1 | | 12 |
| Pounds | 5 | 6 | | 11 |

*Products of Alaska herring industry in 1935*

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Pounds | Value | Pounds | Value | Pounds | Value | Pounds | Value |
| Fresh, for bait | 2,059,055 | $22,059 | 273,750 | $2,665 | | | 2,332,805 | $24,724 |
| Frozen, for bait | 3,626,670 | 25,788 | | | | | 3,626,670 | 25,788 |
| Frozen, for food | | | 40,000 | 1,200 | | | 40,000 | 1,200 |
| Pickled, for food: | | | | | | | | |
| Scotch cure | 2,187,000 | 116,612 | 9,343,325 | 543,055 | 3,412,425 | $148,397 | 14,942,750 | 808,064 |
| Norwegian cure | | | 4,000 | 360 | | | 4.000 | 360 |
| Roused for food (bloater stock) | | | 108,150 | 3,245 | 1,211,320 | 31,548 | 1,319,470 | 34,793 |
| Spiced | 1,000 | 160 | | | | | 1,000 | 160 |
| Dry salted | | | | | 314,775 | 7,551 | 314,775 | 7,551 |
| Meal | 18,108,962 | 216,744 | 12,014,194 | 140,984 | | | 30,123,156 | 357,728 |
| Oil | [1] 16,797,975 | 669,385 | [2] 11,645,092 | 444,339 | | | [3] 28,443,067 | 1,113,724 |
| Total | 42,780,662 | 1,050,748 | 33,428,511 | 1,135,848 | 4,938,520 | 187,496 | 81,147,693 | 2,374,092 |

[1] 2,239,730 gallons. [2] 1,552,679 gallons. [3] 3,792,409 gallons.

## HALIBUT

A program for controlling production was again adopted by the halibut fleet, whereby limitations were placed on the catch per man per trip, the amounts varying according to the fishing area and the port of landing. In addition, each vessel was required to remain in port for a certain number of days between trips. Although the results were not all that had been expected, the effect of this control program on market conditions was of material benefit to the industry.

Under the regulations of the International Fisheries Commission the legal fishing season for halibut opened on March 1, but most of the fishermen did not begin operations until April 10, partly because they were endeavoring to secure a minimum price guarantee on their catch and partly because of the large carryover of frozen halibut from the 1934 season. As a result of the delay in starting, operations in the fall extended later than usual: the quota fixed by regulation for area no. 2 was reached and that area was closed on September 6; in area no. 3 the catch was somewhat short of the quota when fishing was closed on December 26. No quotas were established for areas 1 and 4, where the closing dates were the same as for areas 2 and 3, respectively.

Halibut livers were again in demand for pharmaceutical use, and the price was almost double that of the previous year.

Scientific studies of the Pacific halibut were continued by the International Fisheries Commission under the direction of Dr. William F. Thompson. The vessel *Paragon* was chartered in the winter of 1934–35 to carry on investigations off the coast of British Columbia. From the data thus collected it is possible to determine the trend of the fishery and the effectiveness of the regulations in improving the banks.

### STATISTICAL SUMMARY

Four hundred and twenty-five persons were employed in the Alaska halibut fishery in 1935—a decrease of 177 from the number reported for the preceding year, and products amounted to 9,805,680 pounds, valued at $607,845. This production represents the total fares of the Alaska halibut fleet, which comprises all American vessels landing more than one-half of their catch in Alaska or British Columbia ports rather than in the States. Landings of halibut in Alaska totaled 6,382,681 pounds valued at $377,123, which include 6,000 pounds valued at $500 landed by Canadian vessels. In 1934 the landings of the Alaska fleet were 13,221,338 pounds valued at $804,785, and landings in Alaska amounted to 7,151,669 pounds valued at $398,337. Fares of the Alaska fleet in 1935, therefore, decreased 26 percent in quantity and 24 percent in value from 1934. The landings in Alaska ports in 1935 decreased about 11 percent in quantity and 5 percent in value from the preceding year.

These statistics were compiled from data collected by the International Fisheries Commission and by agents of the Bureau. The amount of halibut livers landed by the Alaska fleet was not reported, but it was stated that there were altogether about 924,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $375,000, landed at Alaska and Pacific coast ports during 1935 by American vessels.

*Persons engaged, wages paid, and operating units, Alaska halibut industry, 1935*

| Items | Total | Items | Total |
|---|---|---|---|
| PERSONS ENGAGED | | OPERATING UNITS | |
| Fishermen: Whites | 404 | Vessels: | |
| Shoresmen: Whites | 21 | Power, over 5 tons | 78 |
| | | Net tonnage | 1,072 |
| Total | 425 | Launches | 29 |
| | | Skates of lines | 1,886 |
| Wages paid shoresmen | $5,900 | | |

*Products of the Alaska halibut fishery in 1935*

| Products | Pounds | Value |
|---|---|---|
| Fresh (including local) | 5,936,134 | $363,525 |
| Frozen | 3,869,546 | 244,320 |
| Total | 9,805,680 | 607,845 |

## COD

A limited amount of cod fishing was carried on in 1935 from shore stations in the Shumagin Islands region and at Unalaska, partly in connection with salmon pickling and herring operations. Ten persons, whites, were engaged in the industry, a decrease of 44 from the number reported for the previous year. Products of the shore fishery were as follows: 106,808 pounds of dry-salted cod, valued at $4,555; 32,789 pounds of pickled cod, valued at $1,130; and 8,140 pounds of stockfish, valued at $1,128—a total of 147,737 pounds, valued at $6,813, as compared with 492,905 pounds, valued at $19,906, in 1934.

There were 5 sailing vessels in the Bering Sea fleet, the products of which are not included with the Alaska fisheries output because the vessels operate from and land their fares in ports of the Pacific Coast States. Of these, the *Sophie Christenson* (570 tons) was operated by the Pacific Coast Codfish Co., the *Azalea* (365 tons) and the *Wawona* (413 tons) were operated by the Robinson Fisheries Co., and the *Louise* (328 tons) and *William H. Smith* (496 tons) by the Union Fish Co.

Products of the offshore fishery were 4,422,411 pounds of dry-salted cod, valued at $199,027, and 16,926 pounds of tongues, valued at $1,162—a total of 4,439,337 pounds valued at $200,189, as compared with 4,942,376 pounds valued at $213,366 in 1934. The offshore fleet employed 202 persons, or 3 more than in the previous year.

## WHALES

The American Pacific Whaling Co. again operated its plants at Port Hobron and Akutan, using seven steam whalers during the season. Employment was given to 238 persons, of whom 216 were whites and 22 natives.

Three hundred and ninety-four whales were taken, consisting of 94 finback, 141 humpback, 87 sulphur bottom, 70 sperm, and 2 right whales. This is a decrease of 71 from the number taken in 1934.

Products of the whale fishery were 833,299 gallons of whale oil, valued at $312,560; 192,850 gallons of sperm oil, valued at $46,284; 852 tons of fertilizer from meat, valued at $21,800; and 487 tons of bone fertilizer, valued at $9,740—a total value of $390,384, as compared with $251,005 in 1934.

## CLAMS

Although operations in the clam industry in the Seward-Katalla district were adversely affected by labor difficulties during the spring, the pack limit of 552,000 pounds for the first 6 months, as specified by the regulations for that area, was reached on June 19, and the summer closed season extended from that date through August 15. Unfavorable market conditions curtailed the fall pack however, so that the production in the district was considerably less than in the previous year.

A study of the condition of the razor clam fishery in the vicinity of Cordova by Seton H. Thompson and Dr. F. W. Weymouth, published as Investigational Report No. 29, shows the clam stock on the beds in this region to be well able to withstand the drain of commerical fishing under existing regulations.

In the Kodiak area there was a decided increase in production over that for 1934, due to the resumption of operations at Kukak Bay. Of the total output of clams in Alaska in 1935, approximately 65 percent came from the vicinity of Cordova, 27 percent from the Kodiak area, and 4 percent each from Cook Inlet and southeast Alaska.

Fifteen firms in central Alaska handled clams, chiefly in conjunction with other branches of the fisheries. Among the more important operators were the W. R. Gilbert Co., Inc., Pioneer Canneries, Inc., Scotty's Packing Co., Strand-Jensen Fisheries Co., Alaska Icepak Corporation, Cordova Fisheries Co., Inc., E. A. Haltness, and S. E. Smith Packing Co., in Cordova and vicinity; the Enterprise Packing Co. and Ninilchik Packing Co. on Cook Inlet, and the Surf Canneries at Kukak Bay. In southeast Alaska a small quantity of hard-shell clams was packed by the crab cannery of V. L. Broadway & Co. at Wrangell and by the salmon cannery of Lane Brothers at Moira Sound.

The number of persons employed in the clam industry in 1935 was 448, of whom 389 were whites, 55 natives, and 4 Filipinos. The output consisted of 34,259 cases, containing 889,302 pounds (857,742 pounds of razor clams and 31,560 pounds of butter clams), valued at $197,581. This is an increase of about 14 percent in quantity and 5 percent in value as compared with figures for 1934, when clam products amounted to 782,388 pounds, valued at $188,666.

*Products of the Alaska clam industry in 1935*

| Item | Cases | Pounds | Value |
|---|---|---|---|
| Minced: | | | |
| ½-pound cans (48 to case) | 24,793 | 595,032 | $137,315 |
| 10-ounce cans (48 to case) | 8,347 | 250,410 | 53,900 |
| 1-pound cans (48 to case) | 177 | 8,496 | 1,433 |
| 2-pound cans (24 to case) | 490 | 23,520 | 2,450 |
| Whole: | | | |
| ½-pound cans (48 to case) | 87 | 2,088 | 378 |
| 10-ounce cans (48 to case) | 148 | 4,440 | 1,234 |
| 1-pound cans (48 to case) | 42 | 2,016 | 321 |
| 10-pound cans (6 to case) | 25 | 1,500 | 250 |
| Juice: | | | |
| ½-pound cans (24 to case) | 150 | 1,800 | 300 |
| Total | 34,259 | 889,302 | 197,581 |

## SHRIMP

Three plants in southeast Alaska—one at Petersburg and two at Wrangell—were again engaged primarily in the shrimp industry, operating on about the same scale as in the preceding year. A small quantity of shrimp was also produced by a company in the Cordova district, whose chief operations were in the crab fishery.

There were 172 persons engaged in the industry, of whom 50 were whites, 80 natives, 20 Japanese, and 22 Filipinos. Products consisted of 371,885 pounds of shrimp meat, valued at $126,649; 9,777 pounds of fresh shrimp in shell, valued at $1,407; 1,629 pounds of raw frozen shrimp, valued at $652; and 576 pounds of canned shrimp meat (24 cases of ½-pound cans, 48 to the case) valued at $192—a total of 383,867 pounds, valued at $128,900. Comparable figures for 1934 show a production of 381,456 pounds, valued at $120,111.

## CRABS

Eleven companies handled crabs in Alaska in 1935, the same number as in the preceding year. The more important operators in southeast Alaska were the Alaskan Glacier Sea Foods Co. at Hoonah and Petersburg, the latter plant being used primarily in the shrimp fishery; the Stikine Sea Foods Co., at Wrangell, also devoted chiefly to the production of shrimp; V. L. Boardway & Co., at Wrangell; and Kayler-Otness, Inc., at Petersburg. In the central district the principal operators were the Alaska Icepak Corporation, primarily engaged in salmon canning, the Gulf Packing Co., and the Northern Sea Foods Co., all at Cordova.

The production of canned crabs declined sharply from that of 1934, due in part to the utilization of a larger proportion of the catch for cold-packing. The regulations providing for a 2-month closed season in the summer, effective for the first time in 1935, also curtailed the output to some extent.

One hundred and sixty-seven persons were engaged in the industry, of whom 105 were whites, 60 natives, 1 Filipino, and 1 Mexican. Products consisted of 324,370 pounds canned (9,711 cases of ½-pound cans, 1,731 cases of 6½-ounce cans, and 1,160 cases of 1-pound cans, 48 to the case; and 39 cases of 2-pound cans, 24 to the case), valued at $106,832; 137,906 pounds of cold-packed meat, valued at $53,607; and 1,436 dozen whole crabs in the shell, valued at $2,889. With the exception of 960 pounds of canned king crabs (40 cases of ½-pound cans, 48 to the case) valued at $280, the entire production was of Dungeness crab. The total output of crab products in 1935 was 499,538 pounds, valued at $163,328, as compared with 643,148 pounds valued at $207,663 in 1934, a decrease of 22 percent in quantity and 21 percent in value.

### JAPANESE VESSELS IN BERING SEA

Two Japanese floating plants carried on crab-canning operations in Bering Sea waters in 1935—the *Taihoku Maru* (8,253 tons), which had engaged in similar activities in 1930, 1933, and 1934, and the *Ryokai Maru* (4,643 tons), operating for the first time in this area. The former vessel, used primarily in the reduction of fish meal, was accompanied by 3 accessory trawlers of 398 tons each and 8 sea-bottom-seine motorboats of 88 tons each. Three accessory motorboats, of from 44 to 80 tons each, were with the *Ryokai Maru*.

The training ship *Hakuyo Maru*, of the Imperial Fisheries Institute, again made a trip to Bering Sea and Bristol Bay with a group of students for practice in deep-sea fishing. The vessel did not call at any Alaska ports.

The Japanese scouting ship *Hakuho Maru*, of the Department of Agriculture and Forestry, also made a cruise to Bering Sea, to investigate the migration routes of fur seals. Katsumi Miyataka, the department's fur-seal investigator, was aboard. En route from Japan the *Hakuho Maru* was at Attu Island for a few days in June. From July 10 to July 17 it was anchored off East Landing, St. Paul Island, and from July 18 to July 20, off St. George Island. Mr. Miyataka and others visited both islands to observe fur-seal and fox life.

### TROUT

Small amounts of Dolly Varden and steelhead trout were handled in southeast Alaska at plants engaged primarily in other branches of the fisheries. The reported products were as follows: Dolly Vardens, 16,470 pounds fresh, valued at $1,135, and 6,895 pounds frozen, valued at $450; steelheads, 9,517 pounds frozen, valued at $820. The total output of both species was 32,882 pounds valued at $2,405, as compared with 67,613 pounds valued at $5,017 in 1934.

### MISCELLANEOUS FISHERY PRODUCTS

Fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed at ports of Alaska and British Columbia and at Seattle. Such products landed in Alaska in 1935 were as follows: Sablefish, 80,516 pounds fresh, valued at $4,428; 478,769 pounds frozen, valued at $18,093; and 6,161 pounds pickled, valued at $318; rockfish, 5,344 pounds frozen, valued at $189; and flounders, 250,000 pounds fresh, for mink feed, valued at $3,750.

## FUR-SEAL INDUSTRY

### PRIBILOF ISLANDS

#### GENERAL ADMINISTRATIVE WORK

In 1935, 57,296 fur-seal skins were taken at the Pribilof Islands. This is an increase of 3,826 skins over the number taken in 1934, and constitutes the largest take at the islands in 46 years. As in 1934, 85 percent of these skins were shipped to the Fouke Fur Co. at St. Louis, Mo., and 15 percent were delivered to a representative of the Canadian Government at Seattle as the share of Great Britain in accordance with the terms of the treaty of July 7, 1911. Settlement of the Japanese share of 15 percent, due under the same treaty, is made from the net proceeds of the sale of dressed and dyed sealskins.

Sealing and other work at the islands was carried on largely by the natives under supervision of white employees. As wards of the Government, the natives received in exchange for their services all the necessaries of life, including food, clothing, housing, medical attention, and educational facilities, and in addition small cash payments on a piecework basis.

A number of improvements were made in buildings, roads, and equipment to enable proper handling of the annually increasing take of sealskins. Of particular importance was the modernization of the byproducts plants which was put in operation for the first time in 1935. A much-needed new school building on St. George Island was completed during the year.

Coast Guard cutters accompanied the fur-seal herd northward from a point off the southern boundary of the State of Washington to the Pribilof Islands, and continued to patrol in Bering Sea while the herd was in those waters. A patrol was maintained off the Washington coast and in the vicinity of Sitka, Alaska, by vessels of the Bureau of Fisheries. Collections of seal stomachs were made at these places to provide information as to the food of fur seals during their migration.

The U. S. S. *Sirius* was detailed by the Navy Department to make a round trip from Seattle to the Pribilof Islands for the purpose of transporting the principal annual shipment of supplies and returning the season's take of sealskins. The Bureau's vessel *Penguin* also made several voyages from Seattle during the year, carrying passengers and perishable freight to the islands.

## TRANSPORTATION OF SUPPLIES

On July 25 the U. S. S. *Sirius*, naval supply vessel, sailed from Seattle for the Pribilof Islands with a cargo of supplies, consisting of 1,212 tons of general freight and 67,645 board feet of lumber for St. Paul Island and 613 tons of freight and 174,250 board feet of lumber for St. George Island, a total of 1,825 tons of miscellaneous cargo and 241,895 board feet of lumber. Other supplies were transported to St. Paul Island for the Navy Department, and to the Aleutian Islands for the Navy Department and the Coast and Geodetic Survey. St. Paul Island was reached on August 4.

The discharge of cargo and loading of outgoing freight were completed in 10 days. The latter consisted of 480 barrels of sealskins, 126 barrels of blubber, 189 empty oil drums, 1,193 sacks of seal meal, and 5 live fur seals from St. Paul Island, and 233 barrels of sealskins and 142 empty oil drums from St. George Island. The *Sirius* departed from St. Paul Island on August 14 and arrived at Seattle on August 23.

Additional supplies were shipped to the islands on each of the five trips of the *Penguin* from Seattle.

## POWER VESSEL "PENGUIN"

The power vessel *Penguin* made five round-trip voyages from Seattle to the Pribilof Islands in the calendar year 1935, carrying shipments of supplies, chiefly perishable foodstuffs, and transporting employees engaged in fur-seal work. It was used also in the performance of inter-island work during the sealing season, and in transporting native workmen from villages along the Alaska Peninsula to the islands for temporary employment during the summer and returning them to their homes in the fall.

Extensive repairs were made to the *Penguin* at the beginning of the year and departure on the first voyage was delayed until February 16.

The dates of the voyages north were as follows: February 16–28, May 1–12, June 10–21, August 24 to September 5, and October 10–24. Return trips from the Pribilofs to Seattle covered the following periods: March 5–25, May 18–28, August 4–13, September 12–22, and October 30 to November 14.

In addition to the shipments of supplies on these voyages, transportation was afforded 121 passengers for the Bureau, 18 for the Navy Department, 2 for the Coast Guard, and 1 for the Office of Indian Affairs. Similar service was extended to a number of unofficial travelers.

The *Penguin* cruised a total of 27,708 nautical miles during the year.

### ROADS

*St. Paul Island.*—Three thousand feet of new road toward Reef rookery, on St. Paul Island, was completed, and considerable work was done on resurfacing and widening roads previously built. The improvement of the old roads included also the elimination of curves as much as possible and the filling in of swales to make a more level surface. Extensive repairs were made after the storm of October 7, as the high tide washed out the road in a number of places, particularly on that part of the Northeast Point road between the village and Icehouse Lake.

*St. George Island.*—On St. George Island, 5,360 feet of plank road was laid during the year.

### BUILDINGS

*St. Paul Island.*—Only minor improvements were undertaken on St. Paul Island during the season. Sod was put around the dispensary, hospital, and three cottages for white employees. Cement sidewalks were also built around the cottages, and a walk between the dispensary and hospital. Repairs were made on the new dock, which was damaged by the high tide in early October.

*St. George Island.*—The new schoolhouse on St. George Island, which was begun in 1933, and the school sewer system were completed. A watch house was built at Staraya Artil.

### BYPRODUCTS PLANT

The byproducts plant at St. Paul Island, which had been rebuilt and equipped with modern machinery in 1931, was overhauled and put in operation during the 1935 sealing season for the utilization of fur-seal carcasses. Considerable difficulty was experienced in making the machinery operate properly after being idle for 4 years. One of the presses was found to be defective, and operations accordingly were much curtailed.

Approximately 14,000 carcasses and 395,200 pounds of blubber were utilized by the plant and yielded 155,254 pounds of seal meal and 18,394 gallons of seal oil. About 6,300 pounds of meal and 106 gallons of oil were retained at the islands for use as fox feed. Seventy gallons of grease and 600 gallons of foots, or residual oil, remained in the settling tanks, some of which also may be used for fox feed. Fifty gallons of oil were used as samples and for experimental purposes.

Of the remaining meal, 1,030 pounds were shipped to Seattle on the *Penguin* in August for experimental use as fish food. The balance of

147,924 pounds was shipped to Seattle on the *Sirius*, and distributed to the Bureau's hatcheries throughout the country, where it has proved to be a nutritious food for young fish.

All oil not used as samples or for experimental purposes or for fox feed was shipped to Seattle on the *Penguin* in October. This shipment consisted of 13,922 gallons of No. 1 oil and 4,316 gallons of No. 2 oil, a total of 18,238 gallons, which was sold to the highest bidder at 27 cents per gallon. The proceeds of this sale, amounting to $4,924.26, were covered into the United States Treasury.

## NATIVES

### CENSUS

On December 31, 1935, the total native population on St. Paul Island was 247, including 20 persons who were temporarily absent from the island. There were 11 births and 4 deaths during the year and 4 permanent departures, leaving a net increase of 3 in the population.

The census of St. George Island on December 31, 1935, showed a population of 161 natives, an increase of 3 for the year, there having been 5 births and 2 deaths.

The total population of both islands at the end of 1935 was 408, an increase of 6 over the total for 1934.

### MEDICAL SERVICE

Two physicians were stationed at the islands throughout the year—one on St. Paul Island and one on St. George Island—to look after the health of the natives and of Government employees and their families. The medical aid included periodic physical examinations of all school children and instructions in proper care of the teeth and oral hygiene. In general, the health of the natives was good, and sanitary conditions in the villages were satisfactory.

### SCHOOLS

Schools for the native children are maintained on St. Paul and St. George Islands, two teachers being employed on each island. Instruction is confined to the elementary branches, including some manual training and home economics.

The 1934–35 school year on both islands began on September 17, 1934, and continued for 8 months, the school on St. Paul Island closing on May 17, and that on St. George Island on May 15, 1935.

On St. Paul Island 20 boys and 13 girls were enrolled in the junior school and 12 boys and 19 girls in the senior school, a total of 64 pupils. On St. George Island 10 boys and 10 girls were in the junior school and 10 boys and 14 girls in the senior school, a total of 44 pupils.

### SAVINGS ACCOUNTS

The Commissioner of Fisheries, as trustee, had custody during the year of certain funds belonging to Pribilof Islands natives. These funds were deposited in the Washington Loan & Trust Co., Washington, D. C., where interest, compounded semiannually, was received

at the rate of 2½ percent. A summary of the trust account for the year 1935 is shown in the statement that follows:

| | |
|---|---|
| On hand Jan. 1, 1935 | $5, 760. 64 |
| Interest earned from Jan. 1 to Dec. 31, 1935 | 135. 64 |
| | 5, 896. 28 |
| Withdrawn by natives | 875. 23 |
| On hand Dec. 31, 1935 | 5, 021. 05 |

An itemized statement of the funds, showing the individual accounts follows:

*Funds of the Pribilof Islands natives in the custody of the United States Commissioner of Fisheries, as trustee, Dec. 31, 1935*

| | | | |
|---|---|---|---|
| Gromoff, Iuliania | $390. 37 | Merculief, Erena | $648. 59 |
| Kochutin, Alexandra | 1, 878. 48 | Merculief, George | 106. 90 |
| Kozloff, Marina | 131. 03 | Merculief, Tatiana | 585. 20 |
| Lestenkof, Michael | 414. 86 | Pankoff, Agrippina | 200. 98 |
| Merculief, Alexandra | 90. 51 | | |
| Merculief, Daniel | 503. 99 | Total | 5, 021. 05 |
| Merculief, Elizabeth | 70. 14 | | |

PAYMENTS FOR TAKING FUR-SEAL SKINS

For their work in taking and curing sealskins, the natives of the Pribilof Islands are paid cash at a specified rate per skin. In order that the collective earnings may be equitably distributed, the sealers on each island are divided into classes according to their skill and ability, and the total amount for the island is apportioned among them, each member of a given class receiving an equal share. Small bonuses are paid for special services.

Payments to natives on St. Paul Island in 1935 were at the rate of 60 cents per skin. For the 45,824 sealskins taken, the total payment was $27,494.40, and in addition $180 was paid to two foremen and four mess attendants.

Natives on St. George Island received cash payment at the rate of 65 cents per skin on the take of fur-seal skins in 1935. For the 11,472 sealskins taken, the sum of $7,456.80 was distributed among the various classes of workmen, an extra allowance equal to the payment on 12 skins being given to one of the sealers for his services as company house cook. An additional sum of $100 was paid to two native foremen.

The details of these payments are shown in the following table:

*Payments to Pribilof Islands natives for taking fur-seal skins, calendar year 1935*

| Classification | St. Paul Island | | | St. George Island | | |
|---|---|---|---|---|---|---|
| | Number of men | Share of each | Total | Number of men | Share of each | Total |
| First class | 31 | $544. 20 | $16, 870. 20 | 27 | $204. 75 | $5, 528. 25 |
| Second class | 11 | 471. 00 | 5, 181. 00 | 6 | 162. 50 | 975. 00 |
| Third class | 7 | 314. 40 | 2, 200. 80 | 2 | 123. 50 | 247. 00 |
| Fourth class | 11 | 249. 00 | 2, 739. 00 | 5 | 90. 35 | 451. 75 |
| Fifth class | 7 | 60. 60 | 424. 20 | 3 | 52. 00 | 156. 00 |
| Boys' class | 3 | 26. 40 | 79. 20 | 2 | 39. 00 | 78. 00 |
| Do | | | | 1 | 13. 00 | 13. 00 |
| Company house cook | | | | | 7. 80 | 7. 80 |
| Foreman (additional compensation) | | | 60. 00 | | | 55. 00 |
| Do | | | 40. 00 | | | 45. 00 |
| Mess attendants, 4 | | | 80. 00 | | | |
| Total | 70 | | 27, 674. 40 | 46 | | 7, 556. 80 |

### PAYMENTS FOR TAKING FOX SKINS

The natives were paid $5 in cash for each fox skin taken on the Pribilof Islands in the 1934–35 season. The total payments amounted to $1,000 for the 200 skins taken on St. Paul Island and $4,010 for the 802 skins taken on St. George Island, a total of $5,010.

## FUR SEALS

### KILLINGS

In 1935, 57,296 fur seals were killed, of which 45,824 were taken on St. Paul Island and 11,472 on St. George Island. Details in regard to the killings are shown in the following tabulations:

*Seal killings on Pribilof Islands in 1935*

ST. PAUL ISLAND

| Date | Serial no. of drive | Hauling ground | Skins secured |
|---|---|---|---|
| June 1 | 1 | Sea Lion Rock (Sivutch) | 97 |
| 10 | 2 | Polovina | 79 |
| 19 | 3 | Zapadni and Little Zapadni | 261 |
| 20 | 4 | Reef and Gorbatch | 894 |
| 21 | 5 | Polovina | 283 |
| 22 | 6 | Vostochni and Morjovi | 1,086 |
| 23 | 7 | Zapadni and Little Zapadni | 212 |
| 24 | 8 | Tolstoi, Lukanin, and Kitovi | 388 |
| 25 | 9 | Reef and Gorbatch | 1,462 |
| 26 | 10 | Polovina and Little Polovina | 314 |
| 27 | 11 | Vostochni and Morjovi | 1,275 |
| 28 | 12 | Zapadni | 667 |
| 29 | 13 | Tolstoi, Lukanin, and Kitovi | 429 |
| 30 | 14 | Reef and Gorbatch | 1,584 |
| July 1 | 15 | Vostochni and Morjovi | 904 |
| 2 | 16 | Polovina and Little Polovina | 277 |
| 3 | 17 | Zapadni | 584 |
| 4 | 18 | Tolstoi, Lukanin, and Kitovi | 856 |
| 5 | 19 | Reef and Gorbatch | 1,973 |
| 6 | 20 | Polovina and Little Polovina | 418 |
| 7 | 21 | Vostochni and Morjovi | 3,880 |
| 8 | 22 | Zapadni and Little Zapadni | 862 |
| 9 | 23 | Tolstoi, Lukanin, and Kitovi | 1,591 |
| 10 | 24 | Reef and Gorbatch | 2,287 |
| 11 | 25 | Polovina and Little Polovina | 735 |
| 12 | 26 | Vostochni and Morjovi | 2,495 |
| 13 | 27 | Zapadni | 917 |
| 14 | 28 | Tolstoi, Lukanin, and Kitovi | 732 |
| 15 | 29 | Reef and Gorbatch | 1,254 |
| 16 | 30 | Polovina and Little Polovina | 677 |
| 17 | 31 | Vostochni and Morjovi | 1,379 |
| 18 | 32 | Zapadni and Little Zapadni | 1,218 |
| 19 | 33 | Tolstoi, Lukanin, and Kitovi | 756 |
| 20 | 34 | Reef and Gorbatch | 1,830 |
| 21 | 35 | Polovina and Little Polovina | 759 |
| 22 | 36 | Vostochni and Morjovi | 2,182 |
| 23 | 37 | Zapadni and Little Zapadni | 522 |
| 24 | 38 | Tolstoi, Lukanin, and Kitovi | 874 |
| 25 | 39 | Reef and Gorbatch | 1,646 |
| 26 | 40 | Polovina and Little Polovina | 284 |
| 27 | 41 | Vostochni and Morjovi | 1,326 |
| 28 | 42 | Zapadni and Little Zapadni | 665 |
| 29 | 43 | Tolstoi, Lukanin, and Kitovi | 500 |
| 30 | 44 | Reef and Gorbatch | 1,313 |
| 31 | 45 | Polovina, Little Polovina, Vostochni, and Morjovi | 1,097 |
| | | Total | 45,824 |

*Seal killings on Pribilof Islands in 1935*—Continued

ST. GEORGE ISLAND

| Date | Serial no. of drive | Hauling ground | Skins secured |
|---|---|---|---|
| June 3 | 1 | Staraya Artil | 29 |
| 11 | 2 | North | 57 |
| 13 | 3 | Zapadni | 97 |
| 17 | 4 | North and Staraya Artil | 129 |
| 18 | 5 | East | 58 |
| 19 | 6 | Zapadni | 174 |
| 20 | 7 | North and Staraya Artil | 71 |
| 22 | 8 | East | 47 |
| 23 | 9 | Zapadni | 81 |
| 25 | 10 | North and Staraya Artil | 368 |
| 26 | 11 | East | 136 |
| 27 | 12 | Zapadni | 240 |
| 29 | 13 | North and Staraya Artil | 291 |
| 30 | 14 | East | 219 |
| July 1 | 15 | Zapadni | 182 |
| 3 | 16 | North and Staraya Artil | 560 |
| 4 | 17 | East | 116 |
| 5 | 18 | Zapadni | 212 |
| 7 | 19 | North and Staraya Artil | 1,414 |
| 8 | 20 | East | 368 |
| 9 | 21 | Zapadni | 138 |
| 11 | 22 | North and Staraya Artil | 729 |
| 12 | 23 | East | 261 |
| 13 | 24 | Zapadni | 153 |
| 15 | 25 | North and Staraya Artil | 754 |
| 16 | 26 | East | 326 |
| 17 | 27 | Zapadni | 75 |
| 19 | 28 | North and Staraya Artil | 970 |
| 20 | 29 | East | 164 |
| 21 | 30 | Zapadni | 113 |
| 23 | 31 | North and Staraya Artil | 508 |
| 24 | 32 | East | 288 |
| 25 | 33 | Zapadni | 340 |
| 26 | 34 | North and Staraya Artil | 567 |
| 27 | 35 | East | 211 |
| 28 | 36 | Zapadni | 70 |
| 29 | 37 | North and Staraya Artil | 854 |
| 30 | 38 | East | 102 |
| | | Total | 11,472 |

AGE CLASSES

The age class of a male seal of the Pribilof Islands herd is determined from the length of its body. The classification was derived from measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

*Age classes of male seals, Pribilof Islands*

| Age | Length (inches) | Age | Length (inches) |
|---|---|---|---|
| Yearlings | Up to 36.75. | 4-year-olds | 46 to 51.75. |
| 2-year-olds | 37 to 40.75. | 5-year-olds | 52 to 57.75. |
| 3-year-olds | 41 to 45.75. | 6-year-olds | 58 to 63.75. |

*Ages of seals killed on Pribilof Islands, calendar year 1935*

[On basis of classification shown in preceding table]

| Age | St. Paul Island | St. George Island | Total |
|---|---|---|---|
| 2 year-old males | 880 | 94 | 974 |
| 3-year-old males | 43,657 | 11,233 | 54,890 |
| 4-year-old males | 1,070 | 127 | 1,197 |
| Cows [1] | 217 | 18 | 235 |
| Total | 45,824 | 11,472 | 57,296 |

[1] Cows unavoidably and accidentally killed or found dead.

Some of the seals recorded in the above tabulation as 2-year-olds and 4-year-olds probably were 3-year-olds, as not all male seals of a given age fall within the length limits assigned for the males of that age. As far as possible, the killings in 1935 were confined to 3-year-old males.

### RESERVING OPERATIONS

No 3-year-old male seals were marked for the breeding reserve in 1935. It was evident at the close of the season that the number of adolescent males of this age class was ample to maintain in subsequent years the supply of bulls in sufficient strength to meet all breeding requirements of the herd.

### COMPUTATION OF FUR-SEAL HERD

The computation of the fur-seal herd in 1935 was made by Supt. H. J. Christoffers. As of August 10 the total of all classes was 1,550,913—a numerical increase of 120,495 over the figures for the preceding year. The detailed report will be found on pages 65 to 71 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1924 to 1935, inclusive:

*General comparison of computations of the seal herd on the Pribilof Islands, 1924 to 1935*

| Classes | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|---|
| Harem bulls | 3, 516 | 3, 526 | 4, 034 | 4, 643 | 6, 050 | 7, 187 |
| Breeding cows | 208, 396 | 226, 090 | 244, 114 | 263, 566 | 284, 725 | 307, 491 |
| Surplus bulls | 2, 043 | 3, 558 | 2, 002 | 4, 827 | 5, 285 | 5, 207 |
| Idle bulls | 390 | 311 | 423 | 972 | 1, 449 | 1, 633 |
| 6-year-old males | 8, 489 | 4, 105 | 13, 434 | 13, 450 | 12, 857 | 10, 399 |
| 5-year-old males | 5, 132 | 16, 792 | 16, 812 | 16, 073 | 13, 001 | 7, 016 |
| 4-year-old males | 18, 670 | 18, 692 | 17, 872 | 14, 448 | 7, 798 | 9, 102 |
| 3-year-old males | 21, 551 | 21, 185 | 17, 189 | 9, 730 | 11, 133 | 13, 639 |
| 2-year-old males | 45, 685 | 43, 515 | 38, 183 | 41, 252 | 49, 087 | 64, 354 |
| Yearling males | 59, 291 | 52, 091 | 56, 514 | 61, 026 | 65, 861 | 85, 381 |
| 2-year-old cows | 51, 359 | 49, 786 | 44, 415 | 48, 186 | 57, 061 | 67, 210 |
| Yearling cows | 64, 240 | 57, 309 | 62, 175 | 67, 131 | 72, 481 | 85, 417 |
| Pups | 208, 396 | 226, 090 | 244, 114 | 263, 566 | 284, 725 | 307, 491 |
| Total | 697, 158 | 723, 050 | 761, 281 | 808, 870 | 871, 513 | 971, 527 |

| Classes | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 |
|---|---|---|---|---|---|---|
| Harem bulls | 8, 312 | 9, 233 | 10, 088 | 10, 213 | 10, 770 | 11, 547 |
| Breeding cows | 332, 084 | 358, 642 | 387, 320 | 418, 299 | 451, 751 | 487, 883 |
| Surplus bulls | 3, 963 | 3, 291 | 2, 893 | 4, 700 | 6, 494 | 6, 139 |
| Idle bulls | 1, 899 | 1, 888 | 2, 349 | 2, 341 | 2, 282 | 2, 535 |
| 6-year-old males | 5, 612 | 6, 553 | 8, 154 | 9, 335 | 8, 173 | 11, 117 |
| 5-year-old males | 8, 191 | 10, 193 | 11, 669 | 10, 216 | 13, 897 | 14, 276 |
| 4-year-old males | 11, 327 | 12, 966 | 11, 351 | 15, 441 | 15, 862 | 21, 096 |
| 3-year-old males | 14, 871 | 13, 198 | 17, 849 | 18, 216 | 24, 770 | 28, 165 |
| 2-year-old males | 69, 674 | 74, 828 | 81, 101 | 87, 662 | 94, 920 | 102, 555 |
| Yearling males | 92, 232 | 99, 612 | 107, 592 | 116, 195 | 125, 490 | 135, 525 |
| 2-year-old cows | 72, 605 | 78, 410 | 84, 682 | 91, 454 | 98, 768 | 106, 666 |
| Yearling cows | 92, 247 | 99, 626 | 107, 593 | 116, 197 | 125, 490 | 135, 526 |
| Pups | 332, 084 | 358, 642 | 387, 320 | 418, 299 | 451, 751 | 487, 883 |
| Total | 1, 045, 101 | 1, 127, 082 | 1, 219, 961 | 1, 318, 568 | 1, 430, 418 | 1, 550, 913 |

### CORRECTION IN REPORT OF KILLINGS FOR 1934

When the unpacking of the fur-seal skins shipped from the Pribilof Islands in 1934 was completed, it was found that the consignment to

the Department's selling agents at St. Louis and that to the Dominion of Canada each contained one skin in excess of the number shown on the shipping lists, thus indicating that the number of skins actually taken on the islands in that year was 53,470, instead of 53,468 as originally reported. The discrepancy appears to have been the result of a mistake in the count from one of the kenches, when skins were being barreled on St. George Island, and a corresponding adjustment in a subsequent killing record.

The records are being corrected, therefore, to show a total of 53,470 sealskins taken on the Pribilof Islands in 1934, of which 42,972 were from St. Paul Island and 10,498 from St. George Island. The revised records also show there were allotted to the Dominion of Canada under the provisions of the fur-seal treaty 8,023 skins, consisting of 8,021 as its share of the season's take and 2 additional skins to correct a shortage in the 1933 consignment.

## FOXES

Herds of blue foxes on St. Paul and St. George Islands yield several hundred pelts annually. The care of these herds fits in well with the fur-seal industry, as it requires attention at a time when sealing activities are at a minimum. Throughout the winter when the natural supply of food on the islands is scarce the foxes are fed prepared rations and salted seal meat. During December and January the animals are trapped for their pelts and for marking and releasing for the breeding reserve.

### TRAPPING SEASON OF 1935–36

In the 1935–36 season 1,034 fox skins were taken, of which 1,019 were blue and 15 white. Two hundred and twenty blue and 9 white skins were taken on St. Paul Island and 799 blue and 6 white skins on St. George Island.

After the close of the killing season the foxes did not enter the traps readily because the winter was mild and an ample supply of food could be obtained from the beaches. Six foxes on St. Paul Island and 116 on St. George Island were trapped, marked, and released for future breeding stock. The reserve also includes a considerable number of animals that were not captured during the season.

## REINDEER

*St. Paul Island.*—During the year ended September 30, 1935, 23 reindeer on St. Paul Island were killed and used for food. A count of the animals in the herd on September 26 showed a total of 1,162, of which it was estimated that 350 were the young of the season. The herd appeared to be in excellent condition.

*St. George Island.*—Three reindeer were killed and used for food on St. George Island during the year ended September 30, 1935. A count made on September 30 showed 71 animals in the herd, of which 9 were the young of the season.

## FUR-SEAL SKINS

### SHIPMENTS

Seven hundred and thirteen barrels containing 57,271 fur-seal skins taken on the Pribilof Islands in 1935 were shipped on the U. S. S. *Sirius* and arrived at Seattle on August 23. Delivery of 8,594 skins, packed in 107 barrels, was made to a representative of the Canadian Government at Seattle on August 24, in accordance with provisions of the fur-seal treaty. The remaining 48,677 skins were forwarded by freight to the Fouke Fur Co. at St. Louis, Mo., and arrived there on August 31.

Twenty-five sealskins taken in 1935, specially cured by being stretched and dried, were brought to Seattle on the *Penguin* in August and were turned over to a representative of the Fouke Fur Co. for transporting to St. Louis.

### SALES

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis in 1935—on April 8 and September 16, respectively—at which a total of 50,832 skins were sold. During the year, also, 2,590 sealskins taken on the Pribilof Islands were disposed of at private sales, under special authorization of the Secretary of Commerce. In the following detailed statements the sales of other sealskins by the Department of Commerce for the account of the Government are included, in order that the records may be complete.

*April 8, 1935.*—Twenty-six thousand four hundred and three Pribilof Islands fur-seal skins, dressed, dyed, and machined, were sold on April 8 for $616,990.75. These skins consisted of 12,600 dyed black, 11,500 dyed Safari brown, and 2,303 dyed logwood brown.

*September 16, 1935.*—At the sale on September 16, 24,429 Pribilof Islands fur-seal skins were sold for $569,708.10. Of these, 24,350 dressed, dyed, and machined, brought $569,540, and 79 miscellaneous raw-salted, unhaired, and unhaired and dressed skins brought $168.10. In addition, 125 dressed, dyed, and machined and 75 raw-salted fur-seal skins taken by the Japanese Government on Robben Island in 1934 and allotted to the United States as its share of such skins under provisions of the fur-seal treaty were sold for $2,762.25. There were also sold 14 confiscated fur-seal skins, parchments, for $69, making a total of $572,539.35 for fur-seal skins at this sale.

*Special sales.*—During the year, 2,590 Pribilof Islands fur-seal skins were sold under special authorization by the Department for advertising and promotional purposes, the gross sales amounting to $59,360. Included in the foregoing were 14 skins (7 black and 7 logwood brown) that had been made up into two coats for exhibition. The coats were advertised by the Division of Purchases and Sales and were sold to the highest bidders, the black coat bringing $421.22, and the brown, $200. Of the other skins sold, 1,578 dyed Safari brown brought $39,434.53; 960 dyed black, $18,484.67; 26 dyed logwood brown, $488.02; and 12 skins specially prepared for exhibition purposes, $331.56.

Further details in regard to the sales of sealskins by the Department of Commerce for the account of the Government in 1935 are given in the following tables:

*Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1935*

| Classes and sales | Grade | Number | High | Low | Average | Total | Total number | Average price | Total amount | Percentage |
|---|---|---|---|---|---|---|---|---|---|---|
| DYED BLACK | | | | | | | | | | |
| Extra extra large: | | | | | | | | | | |
| Apr. 8 | III | 4 | $14.00 | $14.00 | $14.00 | $56.00 | 4 | $14.00 | $56.00 | 0.03 |
| Sept. 16 | I and II | 4 | 30.00 | 30.00 | 30.00 | 120.00 | 20 | 26.00 | 520.00 | .17 |
| | Scarred, faulty, etc | 16 | 25.00 | 25.00 | 25.00 | 400.00 | | | | |
| Extra large: | | | | | | | | | | |
| Apr. 8 | I and II | 220 | 33.00 | 29.50 | 31.23 | 6,870.00 | 640 | 25.59 | 16,380.00 | 5.08 |
| | Scarred, faulty, etc | 360 | 24.50 | 23.00 | 24.08 | 8,670.00 | | | | |
| | III | 60 | 14.00 | 14.00 | 14.00 | 840.00 | | | | |
| Sept. 16 | I and II | 213 | 32.50 | 28.00 | 30.19 | 6,430.00 | 532 | 25.27 | 13,445.00 | 4.48 |
| | Scarred, faulty, etc | 229 | 26.00 | 24.00 | 25.13 | 5,755.00 | | | | |
| | III | 90 | 14.00 | 14.00 | 14.00 | 1,260.00 | | | | |
| Large: | | | | | | | | | | |
| Apr. 8 | I and II | 1,510 | 30.50 | 26.00 | 27.67 | 41,785.00 | 3,880 | 24.61 | 95,480.0 | 30.79 |
| | Scarred, faulty, etc | 2,170 | 25.50 | 21.50 | 23.66 | 51,345.00 | | | | |
| | III | 200 | 12.50 | 11.00 | 11.75 | 2,350.00 | | | | |
| Sept 16 | I and II | 2,117 | 30.00 | 23.50 | 24.98 | 52,885.00 | 4,031 | 23.31 | 93,962.00 | 33.96 |
| | Scarred, faulty, etc | 1,721 | 23.50 | 20.50 | 22.33 | 38,425.00 | | | | |
| | III | 193 | 14.00 | 13.50 | 13.74 | 2,652.00 | | | | |
| Medium: | | | | | | | | | | |
| Apr. 8 | I and II | 2,780 | 24.00 | 21.50 | 22.65 | 62,970.00 | 6,980 | 19.38 | 135,250.00 | 55.40 |
| | Scarred, faulty, etc | 3,920 | 19.75 | 16.00 | 17.69 | 69,340.00 | | | | |
| | III | 280 | 11.00 | 10.00 | 10.50 | 2,940.00 | | | | |
| Sept. 16 | I and II | 3,157 | 23.50 | 20.75 | 22.34 | 70,532.75 | 6,135 | 20.55 | 126,091.75 | 51.69 |
| | Scarred, faulty, etc | 2,836 | 19.50 | 18.50 | 19.08 | 54,102.00 | | | | |
| | III | 142 | 11.00 | 8.50 | 10.26 | 1,457.00 | | | | |
| Small medium: | | | | | | | | | | |
| Apr. 8 | I and II | 530 | 16.50 | 15.00 | 15.71 | 8,325.00 | 1,096 | 14.73 | 16,149.00 | 8.70 |
| | Scarred, faulty, etc | 510 | 14.50 | 14.00 | 14.35 | 7,320.00 | | | | |
| | III | 56 | 9.00 | 9.00 | 9.00 | 504.00 | | | | |
| Sept. 16 | I and II | 458 | 20.75 | 17.75 | 18.24 | 8,356.00 | 1,151 | 16.88 | 19,430.50 | 9.70 |
| | Scarred, faulty, etc | 642 | 16.75 | 16.25 | 16.57 | 10,641.00 | | | | |
| | III | 51 | 8.50 | 8.50 | 8.50 | 433.50 | | | | |
| All classes: | | | | | | | | | | |
| Apr. 8 | | | | | | | 12,600 | 20.90 | 263,315.00 | 100.00 |
| Sept. 16 | | | | | | | 11,869 | 21.35 | 253,449.25 | 100.00 |

*Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1935*—Continued

| Classes and sales | Grade | Number | High | Low | Average | Total | Total number | Average price | Total amount | Percentage |
|---|---|---|---|---|---|---|---|---|---|---|
| DYED SAFARI BROWN | | | | | | | | | | |
| Extra extra large: | | | | | | | | | | |
| Apr. 8 | Scarred, faulty, etc | 12 | $27.00 | $27.00 | $27.00 | $324.00 | 12 | $27.00 | $324.00 | 0.10 |
| Extra large: | | | | | | | | | | |
| Apr. 8 | I and II | 402 | 37.00 | 33.50 | 35.36 | 14,214.00 | 656 | 31.74 | 20,819.00 | 5.70 |
| | Scarred, faulty, etc | 239 | 28.75 | 25.50 | 26.95 | 6,440.00 | | | | |
| | III | 15 | 11.00 | 11.00 | 11.00 | 165.00 | | | | |
| Sept. 16 | I and II | 509 | 33.50 | 30.50 | 31.22 | 15,891.50 | 809 | 29.92 | 24,201.50 | 6.84 |
| | Scarred, faulty, etc | 300 | 28.50 | 26.00 | 27.70 | 8,310.00 | | | | |
| Large: | | | | | | | | | | |
| Apr. 8 | I and II | 2,708 | 37.00 | 26.00 | 31.70 | 85,835.50 | 4,878 | 28.60 | 139,490.50 | 42.42 |
| | Scarred, faulty, etc | 2,100 | 27.00 | 24.00 | 25.18 | 52,885.00 | | | | |
| | III | 70 | 11.00 | 11.00 | 11.00 | 770.00 | | | | |
| Sept. 16 | I and II | 2,773 | 30.00 | 25.75 | 27.63 | 76,629.50 | 4,650 | 26.61 | 123,730.50 | 39.30 |
| | Scarred, faulty, etc | 1,830 | 27.75 | 12.50 | 25.43 | 46,537.00 | | | | |
| | III | 47 | 12.00 | 12.00 | 12.00 | 564.00 | | | | |
| Medium: | | | | | | | | | | |
| Apr. 8 | I and II | 3,122 | 29.50 | 24.00 | 26.97 | 84,207.00 | 5,322 | 25.08 | 133,483.25 | 46.28 |
| | Scarred, faulty, etc | 2,075 | 25.75 | 20.50 | 23.08 | 47,901.25 | | | | |
| | III | 125 | 11.00 | 11.00 | 11.00 | 1,375.00 | | | | |
| Sept. 16 | I and II | 3,051 | 29.00 | 24.50 | 26.21 | 79,974.50 | 5,850 | 24.50 | 143,305.75 | 49.45 |
| | Scarred, faulty, etc | 2,726 | 25.00 | 11.00 | 22.95 | 62,555.25 | | | | |
| | III | 73 | 12.00 | 10.00 | 10.63 | 776.00 | | | | |
| Small medium: | | | | | | | | | | |
| Apr. 8 | I and II | 350 | 22.75 | 21.75 | 22.24 | 7,785.00 | 632 | 19.98 | 12,625.00 | 5.50 |
| | Scarred, faulty, etc | 262 | 18.00 | 17.25 | 17.63 | 4,620.00 | | | | |
| | III | 20 | 11.00 | 11.00 | 11.00 | 220.00 | | | | |
| Sept. 16 | I and II | 275 | 23.50 | 22.50 | 22.85 | 6,285.00 | 522 | 20.94 | 10,931.50 | 4.41 |
| | Scarred, faulty, etc | 229 | 20.50 | 11.00 | 19.50 | 4,466.50 | | | | |
| | III | 18 | 10.00 | 10.00 | 10.00 | 180.00 | | | | |
| All classes: | | | | | | | | | | |
| Apr. 8 | | | | | | | 11,500 | 26.67 | 306,741.75 | 100.00 |
| Sept. 16 | | | | | | | 11,831 | 25.54 | 302,169.25 | 100.00 |
| DYED LOGWOOD BROWN | | | | | | | | | | |
| Extra extra large: | | | | | | | | | | |
| Apr. 8 | I and II | 2 | 25.00 | 25.00 | 25.00 | 50.00 | 6 | 24.33 | 146.00 | .26 |
| | Scarred, faulty, etc | 4 | 24.00 | 24.00 | 24.00 | 96.00 | | | | |
| Sept. 16 | Scarred, faulty, etc | 5 | 24.50 | 24.50 | 24.50 | 122.50 | 5 | 24.50 | 122.50 | .77 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Extra large: | | | | | | | | | | |
| Apr. 8 | I and II | 79 | 26.50 | 25.00 | 25.81 | 2,039.00 | 128 | 24.27 | 3,106.50 | 5.56 |
| | Scarred, faulty, etc | 43 | 24.50 | 22.00 | 23.64 | 1,016.50 | | | | |
| | III | 6 | 8.50 | 8.50 | 8.50 | 51.00 | | | | |
| Sept. 16 | I and II | 12 | 25.00 | 25.00 | 25.00 | 300.00 | 30 | 24.70 | 741.00 | 4.61 |
| | Scarred, faulty, etc | 18 | 24.50 | 24.50 | 24.50 | 441.00 | | | | |
| Large: | | | | | | | | | | |
| Apr. 8 | I and II | 298 | 26.00 | 24.50 | 25.38 | 7,564.50 | 749 | 23.19 | 17,370.00 | 32.52 |
| | Scarred, faulty, etc | 436 | 24.50 | 21.00 | 22.20 | 9,678.00 | | | | |
| | III | 15 | 8.50 | 8.50 | 8.50 | 127.50 | | | | |
| Sept. 16 | I and II | 75 | 25.00 | 24.50 | 24.73 | 1,855.00 | 202 | 24.41 | 4,931.50 | 31.08 |
| | Scarred, faulty, etc | 127 | 24.50 | 23.50 | 24.22 | 3,076.50 | | | | |
| Medium: | | | | | | | | | | |
| Apr. 8 | I and II | 380 | 23.00 | 21.00 | 21.71 | 8,248.75 | 1,180 | 19.18 | 22,633.25 | 51.24 |
| | Scarred, faulty, etc | 764 | 19.00 | 17.00 | 18.43 | 14,078.50 | | | | |
| | III | 36 | 8.50 | 8.50 | 8.50 | 306.00 | | | | |
| Sept. 16 | I and II | 113 | 23.50 | 19.50 | 22.46 | 2,538.50 | 393 | 19.69 | 7,738.50 | 60.46 |
| | Scarred, faulty, etc | 280 | 19.50 | 17.50 | 18.57 | 5,200.00 | | | | |
| Small medium: | | | | | | | | | | |
| Apr. 8 | I and II | 54 | 21.75 | 18.00 | 18.87 | 1,019.25 | 240 | 15.33 | 3,678.25 | 10.42 |
| | Scarred faulty, etc | 173 | 18.00 | 14.25 | 14.73 | 2,548.50 | | | | |
| | III | 13 | 8.50 | 8.50 | 8.50 | 110.50 | | | | |
| Sept. 16 | I and II | 16 | 19.50 | 19.50 | 19.50 | 312.00 | 20 | 19.40 | 388.00 | 3.08 |
| | Scarred, faulty, etc | 4 | 19.00 | 19.00 | 19.00 | 76.00 | | | | |
| All classes: | | | | | | | | | | |
| Apr. 8 | | | | | | | 2,303 | 20.38 | 46,934.00 | 100.00 |
| Sept. 16 | | | | | | | 650 | 21.42 | 13,921.50 | 100.00 |
| MISCELLANEOUS | | | | | | | | | | |
| Sept. 16 | Unhaired and dressed | 26 | 2.00 | .50 | 1.88 | 49.00 | 79 | 2.13 | 168.10 | 100.00 |
| | Unhaired | 10 | .30 | .30 | .30 | 3.00 | | | | |
| | Washed and dried | 43 | 2.70 | 2.70 | 2.70 | 116.10 | | | | |

*Special sales of Pribilof Islands fur-seal skins in 1935*

| Date | Number of skins | Description | Price per skin | Total |
|---|---|---|---|---|
| Jan. 30 | 42 | Dyed Safari brown, medium | $23.40 | $982.80 |
| Feb. 28 | 39 | Dyed Safari brown, large | 28.53 | 1,112.67 |
| | 93 | Dyed Safari brown, medium | 23.40 | 2,176.20 |
| | 35 | Dyed Safari brown, small medium | 17.47 | 611.45 |
| | 30 | Dyed Safari brown, large, scarred and faulty | 21.68 | 650.40 |
| | 80 | Dyed Safari brown, medium, scarred and faulty | 17.57 | 1,405.60 |
| | 15 | Dyed Safari brown, small medium, scarred and faulty | 11.55 | 173.25 |
| | 93 | Dyed black, large | 21.10 | 1,962.30 |
| | 83 | Dyed black, medium | 16.35 | 1,357.05 |
| | 38 | Dyed black, small medium | 12.37 | 470.06 |
| | 72 | Dyed black, large, scarred and faulty | 16.35 | 1,177.20 |
| | 90 | Dyed black, medium, scarred and faulty | 13.39 | 1,205.10 |
| | 24 | Dyed black, small medium, scarred and faulty | 11.42 | 274.08 |
| | 7 | Dyed black [1] | | 421.22 |
| | 7 | Dyed logwood brown [1] | | 200.00 |
| Mar. 31 | 26 | Dyed logwood brown, medium | 18.77 | 488.02 |
| | 50 | Dyed black, medium | 16.35 | 817.50 |
| | 1 | Dyed Safari brown, large | 28.53 | 28.53 |
| | 76 | Dyed Safari brown, medium | 23.40 | 1,778.40 |
| Apr. 7 | 18 | Dyed black, medium | 16.35 | 294.30 |
| | 7 | Dyed Safari brown, medium | 23.40 | 163.80 |
| Apr. 18 | 2 | Dyed black, medium | 22.65 | 45.30 |
| May 30 | 22 | Dyed black, large | 27.67 | 608.74 |
| | 18 | Dyed black, medium | 22.65 | 407.70 |
| | 84 | Dyed Safari brown, large | 31.70 | 2,662.80 |
| | 143 | Dyed Safari brown, medium | 26.97 | 3,856.71 |
| | 60 | Dyed Safari brown, medium, scarred and faulty | 23.08 | 1,384.80 |
| June 28 | 6 | Dyed black, large | 27.67 | 166.02 |
| | 89 | Dyed black, medium | 22.65 | 2,015.85 |
| | 3 | Dyed Safari brown, large | 31.70 | 95.10 |
| | 136 | Dyed Safari brown, medium | 26.97 | 3,667.92 |
| | 50 | Dyed Safari brown, medium, scarred and faulty | 23.08 | 1,154.00 |
| July 30 | 9 | Dyed Safari brown, medium | 26.97 | 242.73 |
| | 12 | Dyed Safari brown, large | 31.70 | 380.40 |
| | 56 | Dyed black, medium | 22.65 | 1,268.40 |
| | 1 | Dyed black, large | 27.67 | 27.67 |
| | 21 | Dyed black, medium, scarred and faulty | 17.69 | 371.49 |
| Aug. 30 | 121 | Dyed Safari brown, medium | 26.97 | 3,263.37 |
| | 2 | Dyed Safari brown, large | 31.70 | 63.40 |
| | 80 | Dyed Safari brown, medium, scarred and faulty | 23.08 | 1,846.40 |
| | 29 | Dyed black, medium, scarred and faulty | 17.69 | 513.01 |
| | 3 | Dyed black, medium | 22.65 | 67.95 |
| Nov. 30 | 70 | Dyed Safari brown, large | 27.63 | 1,934.10 |
| | 160 | Dyed Safari brown, medium | 26.21 | 4,193.60 |
| | 80 | Dyed Safari brown, medium, scarred and faulty | 22.95 | 1,836.00 |
| | 12 | Exhibition skins | 27.63 | 331.56 |
| | 80 | Dyed black, medium | 22.34 | 1,787.20 |
| Dec. 30 | 70 | Dyed Safari brown, large | 27.63 | 1,934.10 |
| | 80 | Dyed Safari brown, medium, scarred and faulty | 22.95 | 1,836.00 |
| | 35 | Dyed black, large | 24.98 | 874.30 |
| | 35 | Dyed black, large, scarred and faulty | 22.33 | 781.55 |
| | 55 | Dyed black, medium | 22.34 | 1,228.70 |
| | 40 | Dyed black, medium, scarred and faulty | 19.08 | 763.20 |
| | 2,590 | | | 59,360.00 |

[1] Skins had been made into coat for display purposes. The coat was advertised and sold to the highest bidder.

*Sale at St. Louis, Mo., Sept. 16, 1935, of 200 fur-seal skins received from Japanese Government under treaty provisions*

| Number of skins | Trade classification | Price per skin | Total |
|---|---|---|---|
| 31 | Dressed, dyed, and machined, Safari brown | $24.00 | $744.00 |
| 43 | Do | 23.25 | 999.75 |
| 51 | Dressed, dyed, and machined, Safari brown; scarred and faulty | 18.50 | 943.50 |
| 75 | Raw salted | 1.00 | 75.00 |
| 200 | | | 2,762.25 |

DISPOSITION OF FUR-SEAL SKINS TAKEN ON PRIBILOF ISLANDS

On January 1, 1935, there were on hand 68,114 fur-seal skins taken on the Pribilof Islands. Of these, 68,082 were at St. Louis, Mo., and 32 at Washington. The foregoing figures include one skin in excess of the number shown at the close of 1934, an extra skin having been found when the season's shipment was unpacked at St. Louis.

In 1935, 57,296 fur-seal skins were taken on the Pribilof Islands, of which 8,594 were allotted to the Government of the Dominion of Canada as its share of the season's take.

Of the skins on hand at the beginning of the year, 53,422 were disposed of, leaving 14,692 unsold, which with the 48,702 from the 1935 take make a total of 63,394 on hand on December 31, 1935. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government fur-seal skins under the control of the Department of Commerce.

*Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1935*

| Source | On hand Jan. 1 | Receipts in 1935 | Sales in in 1935 | On hand Dec. 31 |
|---|---|---|---|---|
| Taken on Pribilof Islands: | | | | |
| Calendar year 1933 | 22,835 | | 22,510 | 325 |
| Calendar year 1934 | [1] 45,247 | | 30,898 | 14,349 |
| Calendar year 1935 | | 48,702 | | 48,702 |
| United States' share of Japanese fur-seal skins: | | | | |
| Season of 1934 | 200 | | 200 | |
| Confiscated fur-seal skins | | 15 | 14 | 1 |
| Total | 68,282 | 48,717 | 53,622 | 63,377 |

[1] Includes 1 extra skin found when shipment was unpacked at St. Louis.

*Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1935*

| Source | On hand Jan. 1 | | | Receipts in 1935 | Disposed of in 1935 | | On hand Dec. 31 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Fouke Fur Co. | Washington office | Total | | Sales | Delivered to Canada | Fouke Fur Co. | Washington office | Total |
| Taken on Pribilof Islands: | | | | | | | | | |
| Calendar year 1918, held for reference purposes | | 7 | 7 | | | | | 7 | 7 |
| Calendar year 1923 | | 3 | 3 | | | | | 3 | 3 |
| Calendar year 1924 | | 1 | 1 | | | | | 1 | 1 |
| Calendar year 1929 | | 5 | 5 | | | | | 5 | 5 |
| Calendar year 1930 | | 2 | 2 | | | | | 2 | 2 |
| Calendar year 1931 | | [1] 14 | 14 | | 14 | | | | |
| Calendar year 1933 | 22,835 | | 22,835 | | 22,510 | | 325 | | 325 |
| Calendar year 1934 | [2] 45,247 | | 45,247 | | 30,898 | | 14,349 | | 14,349 |
| Calendar year 1935 | | | | 57,296 | | 8,594 | 48,702 | | 48,702 |
| Miscellaneous skins held for reference purposes | | 4 | 4 | | | | | 4 | 4 |
| United States share of Japanese sealskins: Season of 1934 | 200 | | 200 | | 200 | | | | |
| Confiscated skins | | | | 15 | 14 | | 1 | | 1 |
| Total | 68,282 | 36 | 68,318 | 57,311 | 53,636 | 8,594 | 63,377 | 22 | 63,399 |

[1] Skins made up into coats for display purposes.
[2] Includes 1 extra skin found when shipment was unpacked at St. Louis.

## SHIPMENT AND SALE OF FOX SKINS

The 184 blue and 16 white fox skins taken on St. Paul Island and the 799 blue and 3 white fox skins taken on St. George Island in the season of 1934–35 were shipped from the islands on the *Penguin*, sailing on May 18. The vessel reached Seattle on May 28, and the fox skins were forwarded by express to the Department's selling agents at St. Louis, Mo.

At the public auction sale in St. Louis on April 8, 1935, 457 blue fox skins of the 1933–34 season's take were sold for $12,590.50, an average of $27.55 per skin. The maximum price was $66, obtained on each of a lot of four no. 1 silvery pelts. One dressed blue fox skin and one dressed white fox skin of the 1932–33 season's take that had been used for exhibition purposes were sold for $38 and $24, respectively.

On September 16, 1935, there were sold at public auction at St. Louis 491 blue and 19 white fox skins taken on the Pribilof Islands in the 1934–35 season. The blue pelts brought $10,136.50, an average of $20.64 each; and the white pelts brought $16 each, a total of $304. The maximum price was $54 a piece on two no. 1 silvery pelts.

## SEA-OTTER SKINS

Eight sea-otter skins were confiscated by the Bureau in 1935. Of these, one was sold at public auction on April 8 for $300, and three were sold on September 16 for $40, $50, and $105, respectively, bringing the gross amount to $495 for the four skins. The remaining four skins, which included one pup skin, were unsold at the close of the year.

Three of the above-mentioned unsold skins were held as evidence in the trial at Valdez in October of certain residents of the Kodiak Island region charged with illegal killing of sea otters. The defendants in the case confessed that they had gone on an expedition in the gas boat *Emma S* in September 1934 to hunt sea otters with rifles and had killed 18 of the animals. One of the defendants, Charles L. E. Svendsen, owner of the boat, was fined $200 and sentenced to 6 months in jail; three others—Daniel Taylor, Mike Gregoroff, and Constantine Chernikoff—were sentenced to 2 months in jail, in addition to the 7 months spent there awaiting trial. Warden Charles P. Turner, of the Kodiak district, handled this matter in behalf of the Bureau.

The killing of sea otters in the waters of the North Pacific Ocean is prohibited by the international treaty of July 7, 1911, and by the law and regulations giving effect thereto. All sea-otter skins illegally taken and brought into territory of the United States are subject to seizure and forfeiture to the Government.

## FUR-SEAL PATROL

### UNITED STATES COAST GUARD

The Treasury Department, as in past years, assigned a number of Coast Guard cutters and patrol boats to maintain a patrol for the protection of the fur-seal herd, both during the northward migration and during the period when the herd is at the Pribilof Islands. Five cutters, three 165-foot patrol boats, and two 125-foot patrol boats were detailed for this work.

The patrol boat *Colfax* operated off the coast of Oregon and Washington from March 5 to March 23. The *Onondaga*, beginning April 5, patrolled from the mouth of Columbia River to Dixon Entrance until the herd had passed. The *Tallapoosa* took up the patrol at Dixon Entrance on April 15 and operated as far west as Kodiak Island until April 30. From May 1 to 15 the *Tallapoosa* patrolled in the area from Kodiak Island to Unimak Pass.

The *Tahoe*, accompanied by the patrol boats *Aurora* and *Calypso*, sailed from San Francisco on April 10 for Unalaska, and was joined in Alaska by the patrol boat *Alert*. The *Aurora* and *Calypso*, operating from the Unalaska base, patrolled the waters of Bering Sea until July 15, when they were relieved by the patrol boats *Daphne* and *Atalanta*, which continued on patrol until the close of the season on October 1. The *Chelan* also was based at Unalaska during the greater part of the season.

The *Northland* left San Francisco on May 5 on its annual cruise to the Arctic Ocean and patrolled in Bering Sea and adjacent waters while en route.

### BUREAU OF FISHERIES

Two vessels of the Bureau of Fisheries were assigned to patrol the waters off the northwest coast of the State of Washington and in the vicinity of Sitka, Alaska, where sealing operations by native Indians are concentrated. The *Brant*, with base at Neah Bay, patrolled in the vicinity of Cape Flattery from April 9 until May 11. The *Scoter* maintained a patrol in the vicinity of Sitka from April 20 to May 27.

A representative of the Bureau of Fisheries was again on duty at La Push, Wash., to secure compliance with the treaty provisions which prohibit the use of firearms or motorboats in the taking of fur seals by aborigines. The stomachs of fur seals killed by the Indians of La Push and Sitka were collected and preserved to provide information as to their food when in these waters.

## SEALING PRIVILEGES ACCORDED ABORIGINES

In accordance with the privilege granted them by article IV of the North Pacific Sealing Convention of July 7, 1911, Indians dwelling on the coasts of Washington, Alaska, and British Columbia carried on pelagic sealing by primitive methods. During the 1935 season there were taken and duly authenticated by officials of the respective Governments 975 fur-seal skins, of which 134 were taken by Indians under the jurisdiction of the United States and 841 by Indians of Canada. The details are as follows:

*Washington.*—Seventy-five sealskins taken by Indians of Washington were authenticated. Of these, 9 were from male seals and 66 from females. The skins were taken by Indians of La Push and Neah Bay in the months from January to May, inclusive, and were authenticated by A. M. Rafn, special agent of the Bureau, and by N. O. Nicholson, superintendent of the Taholah Indian Agency, Hoquiam, Wash.

*Alaska.*—Fifty-nine sealskins taken by natives of Sitka were authenticated by Warden Donald S. Haley. Of these skins, 26 were from male seals and 33 from females. The seals were taken in the waters off Biorka Island in the month of May.

*British Columbia.*—Indians along the British Columbia coast took 841 fur-seal skins in 1935.

## JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

Under the provisions of the fur-seal treaty of 1911, there were allotted to the United States 201 Japanese fur-seal skins, or 10 percent of the number taken by Japan on Robben Island in 1935. These skins were received by the Department's selling agents at St. Louis, Mo., on January 2, 1936.

## FOOD OF FUR SEALS

There have been numerous complaints in recent years from commercial fishermen, chiefly along the British Columbia coast, that the rapidly growing fur-seal herd on its annual northward migration is proving a serious menace to valuable salmon and halibut fisheries in North Pacific waters. Investigation of the food habits of fur seals in 1896 and 1897 indicated that neither salmon nor halibut were important in the diet of fur seals, but that they were eaten when available. These studies indicated that a species of squid, particularly abundant in the North Pacific, constituted the principal food of the seal. Similar studies in 1931 of seals killed off the British Columbia coast showed herring to be by far the most important item of food for fur seals in those waters.

In order to obtain additional information on this subject, 54 seal stomachs were obtained from animals killed by Indians off the Washington coast and 59 from animals similarly killed in the vicinity of Sitka, Alaska. The analysis of the stomach contents, made by Franklin H. May of the Bureau of Biological Survey, shows that herring comprised the bulk of the food of fur seals in these waters during their northward migration. Remains of crustacea and squid were present in relatively small quantities. There was no evidence that salmon or halibut had been eaten.

Independently of this study, Canadian authorities examined 593 fur-seal stomachs from animals killed by Indians off the British Columbia coast during the spring of 1935. Fur seals in these waters also were found to have fed chiefly upon herring, that species being found in 91 percent of the stomachs containing food. Salmon were found in about 7 percent of the stomachs containing food, and halibut was not among any of the food items. Crustacea formed an important part of the diet, as did eulachon and squid.

These studies indicate that there has been no change in the diet of fur seals in recent years. The findings of the early investigators that seals feed near the surface, consuming the form of animal life most available, is well substantiated. It is apparent, therefore, that our valuable commercial fisheries are not endangered by the continued growth of the fur-seal herd at the Pribilof Islands.

## FUR SEALS FOR EXHIBITION

Five live fur seals—three 2-year-old females, one 4-year-old male, and one 5-year-old male—were shipped from the Pribilof Islands on the U. S. S. *Sirius* in August 1935 for the San Diego Zoological Garden. The seals were forwarded from Seattle by express and

reached San Diego on August 27 in excellent condition. While on the vessel they were fed frozen herring, but no food was supplied for the trip from Seattle to San Diego. Ice in gunny sacks on top of the crates kept the animals cool on the journey by train. At the zoo the seals were placed in specially constructed pools, with plenty of shade, and at the close of the year all seemed to be thriving.

Several shipments of fur seals from the Pribilof Islands have been forwarded previously from time to time—the most recent being those in 1928 to the Steinhart Aquarium, Golden Gate Park, San Francisco, and to the National Zoological Park, Washington, D. C., and in 1932 to the latter place. The average life of the animals, however, has been comparatively short, and none of the seals that were formerly shipped now survives. The seals at San Diego, therefore, are the only living specimens of Alaska fur seal in captivity.

## COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1935

By Harry J. Christoffers

The number of seals available for commercial killing at the Pribilof Islands showed a satisfactory increase in the season of 1935. There were 54,890 classed as 3-year-old males killed, as compared with 51,935 in 1934. The number of 3-year-olds in drives continued to increase until July 7, after which there was a gradual reduction. At first it was thought that it would be advisable to discontinue killing about July 25, but as the season advanced it was apparent that sufficient 3-year-old males were arriving to permit continuing the killing season until the last of the month without detriment to the herd.

The large number of 3-year-old males in drives during the last few days of July showed plainly that an ample reserve of this age class remained for breeding requirements. Further evidence of this was seen in the numbers which continued to arrive after commercial killing ceased. There were also plenty of mature young bulls on hand to answer requirements of the 2-year-old females arriving in early August. These bulls appeared to be in excellent condition.

In order to ascertain whether sufficient males have been reserved for breeding requirements it is necessary to make a count, or as close an estimate as possible, of the number of bulls and cows arriving at the islands each season. Previously used methods of estimating the number of cows and counting as closely as possible the number of breeding males were continued this season.

Breeding areas on the various rookeries continued to expand. Where the hauling grounds are within the rookery areas the bachelors now have a hard time working through the harems on account of the numerous breeding bulls. This is particularly true of Reef and Gorbatch rookeries on St. Paul Island and of North rookery on St. George Island. For this reason drives from these rookeries are decreasing in size and drives from rookeries where hauling grounds are adjacent to breeding areas are increasing in size. It soon will be impossible during the height of the season for bachelors to haul out at all on the present Reef and Gorbatch hauling grounds. Presumably they will eventually haul out on Zoltoi sands, adjacent to Gorbatch rookery. In early sealing days all drives were made from Zoltoi. When Zoltoi again becomes the hauling ground for Reef and Gorbatch it will be a great

benefit to the nonkillable seals, as at present the drive from these rookeries is the longest and hardest on either island.

## BULLS

Each year, as the seal herd increases in size, it becomes more difficult to make accurate counts of bulls on the larger rookery areas. By making actual counts on the smaller congested areas of the larger rookeries, however, it is possible to form a very close estimate of the number of bulls on the entire rookery. The counts and estimates thus made are sufficiently accurate for all practical requirements.

Owing to the impossibility of making accurate counts of the larger rookeries, the entire harem and idle bull census should be considered only as a close estimate.

The reserving of sufficient 3-year-old males for breeding requirements is very necessary to provide for a maximum growth of the herd. It is essential, therefore, to continue to take a census or to estimate the number of breeding bulls on hand each year. This is the only way to determine the approximate average harem, which must be maintained at a proper size if the herd is to increase at the maximum rate.

There also must be sufficient mature young bulls to take care of the virgin 2-year-old females. Accurate observations alone can determine whether there are sufficient bulls of this class. It is to the best interests of the herd to reserve a few more males than actually are required for breeding purposes.

Polovina and Polovina Cliffs now form one continuous rookery. Harems now cover that part of the available waterfront which up to this year separated the two rookeries.

On the North and East Cliffs rookeries, St. George Island, harems cover the entire area between the waterfront and the high cliffs. There are therefore no idle bulls in the rear of these rookeries. The idle bulls are found only on the adjacent hauling grounds.

A pure albino 5-year-old male seal was observed on Reef hauling grounds throughout the latter part of the season. Its presence was not noted in the previous years of its existence. The animal was not killed, as it was thought advisable to leave it for further observation, should it live long enough to hold a harem. It appeared to have difficulty in seeing and therefore had a hard time keeping up with the other animals when disturbed or in drives.

*Estimated number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1935*

| Rookery | Date | Harem bulls | Idle bulls | Total | Approximate ratio of idle bulls to harem bulls | Average harem |
|---|---|---|---|---|---|---|
| St. Paul Island: | | | | | | |
| Kitovi | July 19 | 407 | 82 | 489 | 1:5 | 39.65 |
| Lukanin | do | 189 | 26 | 215 | 1:7 | 41.28 |
| Gorbatch | July 20 | 893 | 169 | 1,062 | 1:5 | 45.89 |
| Ardiguen | do | 88 | 15 | 103 | 1:6 | 44.04 |
| Reef | do | 1,671 | 416 | 2,087 | 1:4 | 49.26 |
| Sivutch | do | 426 | 87 | 513 | 1:5 | 59.13 |
| Lagoon | July 19 | 3 | | 3 | | 38.33 |
| Tolstoi | do | 1,059 | 243 | 1,302 | 1:4 | 45.75 |
| Zapadni | July 18 | 942 | 231 | 1,173 | 1:4 | 49.43 |
| Little Zapadni | do | 507 | 84 | 591 | 1:6 | 46.82 |
| Zapadni Reef | do | 57 | 24 | 81 | 1:2 | 14.44 |
| Polovina | do | 382 | 99 | 481 | 1:4 | 43.81 |
| Polovina Cliffs | do | 315 | 79 | 394 | 1:4 | 29.09 |
| Little Polovina | do | 107 | 38 | 145 | 1:3 | 31.19 |
| Morjovi | July 17 | 317 | 72 | 389 | 1:4 | 18.92 |
| Vostochni | do | 2,081 | 417 | 2,498 | 1:5 | 32.09 |
| Total | | 9,444 | 2,082 | 11,526 | 1:5 | 42.14 |
| St. George Island: | | | | | | |
| North | July 21 | 717 | 87 | 804 | 1:8 | 45.29 |
| Staraya Artil | do | 567 | 179 | 746 | 1:3 | 43.15 |
| Zapadni | July 22 | 183 | 57 | 240 | 1:3 | 18.87 |
| South | do | 133 | 8 | 141 | 1:17 | 6.09 |
| East Reef | July 21 | 134 | 39 | 173 | 1:3 | 55.53 |
| East Cliffs | do | 369 | 83 | 452 | 1:4 | 57.57 |
| Total | | 2,103 | 453 | 2,556 | 1:5 | 42.74 |
| Total (both islands) | | 11,547 | 2,535 | 14,082 | 1:5 | 42.25 |

## AVERAGE HAREM

The only way to determine whether sufficient bulls have been reserved is to ascertain the average harem and make observations as to whether there are sufficient young bulls to take care of the late-arriving 2-year-old females. The ideal average harem is considered to be from 40 to 45 females.

The estimated average harem in 1935 for St. Paul Island was 42.14 and for St. George Island 42.74. This is an increase of 0.46 over the preceding year for St. Paul Island and a decrease of 0.41 for St. George Island. The average harem, as estimated, would indicate that sufficient males have been reserved for breeding requirements.

*Computation of breeding cows, based on annual increase of 8 percent, and of average harem, in 1935*

| Rookery | Breeding cows | | Harem bulls, 1935 | Average harem | | |
|---|---|---|---|---|---|---|
| | 1934 | 1935 | | 1935 | 1934 | Increase (+) or decrease (−) in 1935 from 1934 |
| St. Paul Island: | | | | | | |
| Kitovi | 14,944 | 16,139 | 407 | 39.65 | 38.42 | +1.23 |
| Lukanin | 7,225 | 7,803 | 189 | 41.28 | 40.82 | +.46 |
| Gorbatch | 37,943 | 40,978 | 893 | 45.89 | 47.85 | −1.96 |
| Ardiguen | 3,589 | 3,876 | 88 | 44.04 | 40.33 | +3.71 |
| Reef | 76,213 | 82,310 | 1,671 | 49.26 | 51.05 | −1.79 |
| Sivutch | 23,322 | 25,188 | 426 | 59.13 | 58.30 | +.83 |
| Lagoon (actual count pups) | 112 | 115 | 3 | 38.33 | 37.33 | +1.00 |
| Tolstoi | 44,865 | 48,454 | 1,059 | 45.75 | 45.00 | +.75 |
| Zapadni | 43,117 | 46,566 | 942 | 49.43 | 49.78 | −.35 |
| Little Zapadni | 21,978 | 23,736 | 507 | 46.82 | 45.98 | +.84 |
| Zapadni Reef | 762 | 823 | 57 | 14.44 | 12.29 | +2.15 |
| Polovina | 15,495 | 16,735 | 382 | 43.81 | 41.65 | +2.16 |
| Polovina Cliffs | 8,484 | 9,163 | 315 | 29.09 | 26.76 | +2.33 |
| Little Polovina | 3,090 | 3,337 | 107 | 31.19 | 30.00 | +1.19 |
| Morjovi | 5,554 | 5,998 | 317 | 18.92 | 17.97 | +.95 |
| Vostochni | 61,826 | 66,772 | 2,081 | 32.09 | 31.02 | +1.07 |
| Total | 368,519 | 397,993 | 9,444 | 42.14 | 41.68 | +.46 |
| St. George Island: | | | | | | |
| North | 30,068 | 32,473 | 717 | 45.29 | 43.51 | +1.78 |
| Staraya Artil | 22,656 | 24,468 | 567 | 43.15 | 47.40 | −4.25 |
| Zapadni | 3,197 | 3,453 | 183 | 18.87 | 18.70 | +.17 |
| South | 750 | 810 | 133 | 6.09 | 6.10 | −.01 |
| East Reef | 6,890 | 7,441 | 134 | 55.53 | 43.88 | +11.65 |
| East Cliffs | 19,671 | 21,245 | 369 | 57.57 | 63.66 | −6.09 |
| Total | 83,232 | 89,890 | 2,103 | 42.74 | 43.15 | −.41 |
| Total (both islands) | 451,751 | 487,883 | 11,547 | 42.25 | 41.95 | +.30 |

## PUPS AND COWS

Since 1923 it has not been practicable to make an actual count of the number of pups on all rookeries. Pups could be counted on the smaller rookeries but, inasmuch as the larger rookeries normally show a greater yearly increase than the smaller rookeries, the results secured would be unsatisfactory and would not show the true growth of the herd. It appears advisable, therefore, to continue using the average rate of increase in the number of pups as determined from actual counts for the period from 1917 to 1922, inclusive. This average rate of increase of 8 percent will answer for all practical purposes.

The number of dead pups, also, can be estimated only, and the percentage found in 1922 has therefore been applied to each rookery.

The increase in size of rookery areas and the increase in the number of animals in a given area will cause a slight increase in the percentage of dead pups. It is desirable, therefore, to make as close a count as possible of the dead pups on each rookery in order to determine a new death rate.

Inasmuch as a female gives birth to only one pup a year, the number of cows on a given rookery is the same as the number of pups.

*Distribution of pups on the Pribilof Islands, Aug. 10, 1935, and comparison with distribution in 1934*

| Rookery | 1935 | | | | 1934 | 1935 |
|---|---|---|---|---|---|---|
| | Living pups | Dead pups | Total pups | Percent dead pups | Total pups | Increase |
| St. Paul Island: | | | | | | |
| Kitovi | 15,902 | 237 | 16,139 | 1.47 | 14,944 | 1,195 |
| Lukanin | 7,634 | 169 | 7,803 | 2.17 | 7,225 | 578 |
| Gorbatch | 40,626 | 352 | 40,978 | .86 | 37,943 | 3,035 |
| Ardiguen | 3,783 | 93 | 3,876 | 2.39 | 3,589 | 287 |
| Reef | 81,108 | 1,202 | 82,310 | 1.46 | 76,213 | 6,097 |
| Sivutch | 24,573 | 615 | 25,188 | 2.44 | 23,322 | 1,866 |
| Lagoon (actual count) | 115 | -------- | 115 | ---------- | 112 | 3 |
| Tolstoi | 47,780 | 674 | 48,454 | 1.39 | 44,865 | 3,589 |
| Zapadni | 45,765 | 801 | 46,566 | 1.72 | 43,117 | 3,449 |
| Little Zapadni | 23,143 | 593 | 23,736 | 2.50 | 21,978 | 1,758 |
| Zapadni Reef | 816 | 7 | 823 | .80 | 762 | 61 |
| Polovina | 16,479 | 256 | 16,735 | 1.53 | 15,495 | 1,240 |
| Polovina Cliffs | 8,993 | 170 | 9,163 | 1.85 | 8,484 | 679 |
| Little Polovina | 3,253 | 84 | 3,337 | 2.51 | 3,090 | 247 |
| Morjovi | 5,877 | 121 | 5,998 | 2.02 | 5,554 | 444 |
| Vostochni | 65,383 | 1,389 | 66,772 | 2.08 | 61,826 | 4,946 |
| Total | 391,230 | 6,763 | 397,993 | 1.70 | 368,519 | 29,474 |
| St. George Island: | | | | | | |
| North | 32,018 | 455 | 32,473 | 1.40 | 30,068 | 2,405 |
| Staraya Artil | 23,837 | 631 | 24,468 | 2.58 | 22,656 | 1,812 |
| Zapadni | 3,414 | 39 | 3,453 | 1.12 | 3,197 | 256 |
| South | 796 | 14 | 810 | 1.72 | 750 | 60 |
| East Reef | 7,329 | 112 | 7,441 | 1.51 | 6,890 | 551 |
| East Cliffs | 20,928 | 317 | 21,245 | 1.49 | 19,671 | 1,574 |
| Total | 88,322 | 1,568 | 89,890 | 1.74 | 83,232 | 6,658 |
| Total (both islands) | 479,552 | 8,331 | 487,883 | 1.71 | 451,751 | 36,132 |

## MORTALITY OF SEALS AT SEA

In computing the number of seals of the various age classes, the same mortality rates were applied as for the season of 1934. Although mortality rates actually vary considerably from year to year, the present rates appear to answer all essential requirements and therefore should be used until abnormal conditions appear.

## COMPLETE COMPUTATION

Following is a summary showing the number of the various classes of animals in the Pribilof Islands fur-seal herd in 1935. The methods used to compute the number of animals of each class are also shown. The total number of seals of all classes is estimated to be 1,550,913. This is an increase of 8.42 percent over the preceding year.

*Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1935*

| Class | St. Paul Island | St. George Island | Total |
|---|---|---|---|
| Pups, estimated | 397,993 | 89,890 | 487,883 |
| Breeding cows, 3 years old and over, by inference | 397,993 | 89,890 | 487,883 |
| Harem bulls, counted | 9,444 | 2,103 | 11,547 |
| Idle bulls, counted | 2,082 | 453 | 2,535 |
| Yearlings, male and female, estimated: | | | |
| Females born in 1934 | 184,260 | 41,616 | 225,876 |
| Natural mortality, 40 percent | 73,704 | 16,646 | 90,350 |
| Yearling females, Aug. 10, 1935 | 110,556 | 24,970 | 135,526 |

*Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1935*—Continued

| Class | St. Paul Island | St. George Island | Total |
|---|---|---|---|
| Yearlings, male and female, estimated:—Continued. | | | |
| Males born in 1934 | 184, 259 | 41, 616 | 225, 875 |
| Natural mortality, 40 percent | 73, 704 | 16, 646 | 90, 350 |
| Yearling males, Aug. 10, 1935 | 110, 555 | 24, 970 | 135, 525 |
| 2-year-olds, male and female, estimated: | | | |
| Yearling females, Aug. 10, 1934 | 102, 370 | 23, 120 | 125, 490 |
| Natural mortality, 15 percent | 15, 356 | 3, 468 | 18, 824 |
| 2-year-old females, Aug. 10, 1935 | 87, 014 | 19, 652 | 106, 666 |
| Yearling males, Aug. 10, 1934 | 102, 370 | 23, 120 | 125, 490 |
| Natural mortality, 17.5 percent | 17, 915 | 4, 046 | 21, 961 |
| 2-year-old males beginning 1935 | 84, 455 | 19, 074 | 103, 529 |
| 2-year-old males killed in 1935 | 880 | 94 | 974 |
| 2-year-old males, Aug. 10, 1935 | 83, 575 | 18, 980 | 102, 555 |
| 3-year-old males, estimated: | | | |
| 2-year-old males, Aug. 10, 1934 | 77, 423 | 17, 497 | 94, 920 |
| Natural mortality, 12.5 percent | 9, 678 | 2, 187 | 11, 865 |
| 3-year-old males beginning 1935 | 67, 745 | 15, 310 | 83, 055 |
| 3-year-old males killed in 1935 | 43, 657 | 11, 233 | 54, 890 |
| 3-year-old males, Aug. 10, 1935 | 24, 088 | 4, 077 | 28, 165 |
| 4-year-old males, estimated: | | | |
| 3-year-old males, Aug. 10, 1934 | 20, 743 | 4, 027 | 24, 770 |
| Natural mortality, 10 percent | 2, 074 | 403 | 2, 477 |
| 4-year-old males beginning 1935 | 18, 669 | 3, 624 | 22, 293 |
| 4-year-old males killed in 1935 | 1, 070 | 127 | 1, 197 |
| 4-year-old males, Aug. 10, 1935 | 17, 599 | 3, 497 | 21, 096 |
| 5-year-old males, estimated: | | | |
| 4-year-old males, Aug. 10, 1934 | 12, 895 | 2, 967 | 15, 862 |
| Natural mortality, 10 percent | 1, 289 | 297 | 1, 586 |
| 5-year-old males, Aug. 10, 1935 | 11, 606 | 2, 670 | 14, 276 |
| 6-year-old males, estimated: | | | |
| 5-year-old males, Aug. 10, 1934 | 12, 059 | 1, 838 | 13, 897 |
| Natural mortality, 20 percent | 2, 412 | 368 | 2, 780 |
| 6-year-old males, Aug. 10, 1935 | 9, 647 | 1, 470 | 11, 117 |
| Surplus bulls, 7 years old and over, estimated: | | | |
| 6-year-old males, Aug. 10, 1934 | 6, 893 | 1, 280 | 8, 173 |
| Natural mortality, 20 percent | 1, 379 | 256 | 1, 635 |
| 7-year-old males, Aug. 10, 1935 | 5, 514 | 1, 024 | 6, 538 |
| Surplus bulls, Aug. 10, 1934 | (1) | (1) | 6, 494 |
| Natural mortality, 30 percent | | | 1, 918 |
| Remaining surplus for 1935 | | | 4, 546 |
| Breeding bulls of 1934 | 10, 701 | 2, 351 | 13, 052 |
| Natural mortality, 30 percent | 3, 210 | 705 | 3, 915 |
| 1934 bulls remaining in 1935 | 7, 491 | 1, 646 | 9, 137 |
| Breeding bulls of 1935 | 11, 526 | 2, 556 | 14, 082 |
| 1934 bulls remaining, deducted | 7, 491 | 1, 646 | 9, 137 |
| Increment of new bulls in 1935 | 4, 035 | 910 | 4, 945 |
| 7-year-old males computed for 1935 | 5, 514 | 1, 024 | 6, 538 |
| Surplus bulls computed for 1935 | | | 4, 546 |
| Total theoretical bull stock for 1935 | | | 11, 084 |
| New increment of breeding bulls deducted | | | 4, 945 |
| Surplus bulls, Aug. 10, 1935 | | | 6, 139 |

[1] Estimates have been worked out, insofar as possible, to show the approximate number of seals of each class which should be credited to each island. Seals do not haul out, however, in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the 2 islands. The total for both islands, however, is approximately correct.

RECAPITULATION

| Class | Total | Class | Total |
|---|---|---|---|
| Pups | 487,883 | 5-year-old males | 14,276 |
| Cows | 487,883 | 6-year-old males | 11,117 |
| Harem bulls | 11,547 | Surplus bulls | 6,139 |
| Idle bulls | 2,535 | | |
| Yearling females | 135,526 | Total, 1935 | 1,550,913 |
| Yearling males | 135,525 | Total, 1934 | 1,430,418 |
| 2-year-old females | 106,666 | | |
| 2-year-old males | 102,555 | Numerical increase, 1935 | 120,495 |
| 3-year-old males | 28,165 | Percent increase, 1935 | 8.42 |
| 4-year-old males | 21,096 | | |

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# FISHERY INDUSTRIES OF THE UNITED STATES, 1935 [1]

By R. H. Fiedler, *Chief, Division of Fishery Industries*

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[1] Administrative Report No. 24, Appendix II to the Report of the U. S. Commissioner of Fisheries, 1936. Approved for publication, June 3, 1936.

## FOREWORD

This report constitutes a summary of the activities of the Division of Fishery Industries as well as an annual review of fishery statistics. As its name indicates, this Division of the Bureau is concerned with the activities and welfare of the commercial fishery and fishery industries, the trade in fishery products, and the fish canning and preserving industries. Its functions include the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed to solve the technical prob ems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in part 2 of this report, which includes all the detailed statistical information that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. In the preparation of this report, members of the Division's staff have taken part and their assistance is appreciatively acknowledged.

# Part I. OPERATIONS OF THE DIVISION

## COOPERATION WITH OTHER FEDERAL AGENCIES

As in previous years, various members of the Division's technological, economic, and statistical staff assisted other Federal agencies where the work or studies of such agencies required information or advice concerning the fishery industry.

The Bureau also has cooperated with various Federal agencies in obtaining statistical data on our fisheries. The Bureau has the cooperation of the Bureau of Agricultural Economics, Department of Agriculture, in the collection of statistics on the volume of cold-storage holdings of fish, and the health authorities in Washington, D. C., in obtaining the volume of fish handled at the Municipal Fish Wharf and Market in this city. In another instance the Bureau obtains figures on the volume of the quarterly production and holdings of fish oils for the Bureau of the Census.

During most of the past year, the technologists in several of our laboratories carried on a portion of the cooperative work undertaken by the Bureau of Fisheries, the Bureau of Chemistry and Soils, and the Food and Drug Administration, in connection with the development of standards for halibut-liver oil essential in the administration of the Federal Food and Drug Act, and for other purposes. This cooperative investigation will be described in detail elsewhere in this report.

## COOPERATION WITH STATE AGENCIES

In the conduct of its technological investigations, the Bureau has always encouraged and fostered cooperation with the States. By working in close conjunction with the members of the research staffs of various State laboratories and institutions, we have been able to increase the productivity of our relatively small technological staff

[2] Fishery Industries of the United States, 1934. By R. H. Fiedler, Appendix II to the Report of the U. S. Commissioner of Fisheries for 1935, pp. 75–330.

and have been able to carry out such cooperative investigations at considerably less cost. During the past year, the following cooperative investigations were conducted in the State institutions listed:

A member of our technological staff was stationed in the laboratories of the State Medical College, Charleston, S. C., where members of the staff of the State Medical College have given valuable cooperation in a study of the mineral content of aquatic products. Dr. Roe E. Remington and Dr. Kenneth M. Lynch participated in these investigations.

At Massachusetts State College, Amherst, Mass., laboratory facilities were provided for our bacteriologist to study methods for handling fish. Members of the Massachusetts State College staff cooperating in these investigations were Drs. Fellers, Fuller, and Bradley.

At George Washington University, Washington, D. C., Dr. Leland W. Parr, associate professor of bacteriology in the school of medicine, assisted in the supervision of one of our cooperative investigations on sponge disinfectants.

At Cornell University, Ithaca, N. Y., Drs. H. S. Wilgus, Jr., L. C. Norris, and G. F. Heuser cooperated in making feeding tests of fish meals experimentally prepared in our technological investigations.

Dr. J. S. Carver, of Washington State College, Pullman, Wash., cooperated during the past year in carrying on tests with poultry in the feeding of salmon oils and meals experimentally prepared in our Seattle and Alaska laboratories.

The University of Washington, Seattle, Wash., placed space at the disposal of members of our Seattle technological laboratory for the conduct of certain byproducts investigations.

In addition to furnishing free space for the Bureau's laboratories in two of its buildings (discussed elsewhere in this report), the University of Maryland and the Maryland State Agricultural Experiment Station, College Park, Md., carried on in its various laboratories and departments of animal husbandry, cooperative investigations of the feeding value of fishery byproducts. The members of the staffs of these two institutions engaged in these cooperative investigations were Dr. L. B. Broughton, Dr. W. C. Supplee, L. E. Bopst, and M. H. Berry.

A cooperative study of the chemistry of fish proteins was conducted in the laboratories of Western Maryland College, Westminster, Md. Prof. Samuel B. Schofield, head of the chemistry department of this institution, assisted in the supervision of this project.

The Massachusetts Department of Agriculture cooperated with our fish cookery and home economics worker in conducting demonstrations at schools, women's clubs, and various other gatherings in the State of Massachusetts. This educational work was carried on by Miss Agnes I. Webster of our staff under the supervision of R. H. Sullivan, of the State Department.

All of the above cooperative investigations are discussed in detail elsewhere in this report.

In the conduct of its statistical research work, the Bureau also obtains unusual cooperation from various States. The surveys of the fisheries in the various States bordering on the Great Lakes, in the

Pacific Coast States, and in Maryland and Virginia, have been greatly facilitated by special cooperation obtained from the State fishery agencies in these States. With this aid, it is now only necessary for the Bureau to conduct partial surveys in these States to supplement the data available from the fishery agencies.

In addition, in nearly every other State where commercial fishing is prosecuted, some type of cooperation on its statistical work is rendered the Bureau by the State fishery or other agencies. This makes it possible for the Bureau to make statistical surveys of a greater portion of our fishery industries than otherwise would be possible.

## EXHIBIT AT SAN DIEGO

A display depicting the activities of the Bureau was on exhibit during the past year at the California Pacific International Exposition, San Diego, Calif. This was developed by the Division and was part of the Department of Commerce display, housed in the Federal Building. The principal feature was a large diorama, consisting of a painted background of a mountain scene with a built-up foreground of rocks, trees, and underbrush. A pool of water containing live bass and other warm-water fishes was incorporated in the foreground. The fish were supplied by the Bureau and cared for by the California Department of Natural Resources, Bureau of Fish Culture. The painting depicted the fish cultural activities of the Bureau in propagating fish for angling and for capture in the commercial fisheries.

A series of 48 colored transparencies framed in two cross-shaped standards depicted some of the activities of the other Divisions. A booklet giving a brief description of the Bureau's work was distributed to interested persons.

## ECONOMIC AND MARKETING INVESTIGATIONS

There is a recognized need of economic and marketing studies as aids to the industry in merchandizing its commodity. Such studies have been made by the Division in the past and are being continued now as far as possible with the limited funds available; however, they have not been on a scale commensurate with so important an industry, and one which is in such obvious need of these services.

In order to interest a wider group of fishery management officials in this type of work, the writer again urged the members of the National Planning Council of Commercial and Game Fish Commissioners at their meeting in Chicago, Ill., in April 1935, to enter this field of endeavor to aid in bringing about more stable conditions in the fishery industry. Also during the year the writer personally visited the directors of many schools of economics or business administration in various colleges of the country in order to enlist their aid in making economic fishery studies. Without an exception these men were willing to offer any cooperation possible. Since then several schools have begun student studies of localized fishery problems, all of which will be of value to the industry.

The industry in general has realized the need for economic information and through the Fishery Advisory Committee of the Secretary of Commerce, it has endorsed H. R. 8055, now pending in Congress. This bill, introduced by Congressman Bland, chairman of the Com-

mittee on Merchant Marine and Fisheries in the House of Representatives, provides for the conduct of economic fishery research, and for market news and extension services for the fishery industry; these services to be carried on by the Bureau of Fisheries.

### MANUAL FOR ECONOMIC FISHERY SURVEYS

In order to be of aid to fishery management officials, teachers of economics and others in making economic fishery studies, a manual for the conduct of such work was prepared by the writer, assisted by F. F. Johnson, Assistant Chief of the Division, and others. This has been developed in such a manner that it can be used in whole or in part, depending upon the personnel and funds which may be available. The manual consists of schedules for obtaining primary market information, instructions for making the surveys, sample forms for use in tabulating the data, and instructions for tabulation. These were used as the basis for a survey undertaken during this year throughout the State of Florida by the Florida Works Progress Administration with the cooperation of this Bureau, and under the sponsorship of the State board of conservation. Another was undertaken in the city of Durham, N. C., by Duke University, under the supervision of Prof. A. J. Nichol. Several copies of these plans are available from the Bureau for loan to interested parties.

### SURVEY OF FISH HATCHERY FOODS AND FEEDING PRACTICES

During the past year the fish cultural stations of the country were confronted with the problem of increased operating expenses because of the rising costs of packing-house products for fish food. This was brought forcibly to the attention of the State and Federal fish hatchery operators at the third meeting of the National Planning Council of Commercial and Game Fish Commissioners at Chicago in April 1935. At that time it was suggested that a survey be made of available fish foods with the view of finding suitable substitutes which might be available at a lower price. This was undertaken by the Bureau and the findings were reported at the sixty-fifth annual meeting of the American Fisheries Society at Tulsa, Okla., in September 1935, in a report by the writer and V. J. Samson, marketing agent of the Division.

In brief, the survey recorded that in 1934 fish hatchery operators used 11,455,000 pounds of fish food, valued at about $608,000. That great dependence is being placed on packing-house products was shown by the fact that three-fourths of the volume used consisted of such items as animal livers, hearts, and other animal organs which also were among the most expensive feeds used. However, while this condition obtained as regards all hatcheries, it was found that the commercial hatcheries contrasted to Government hatcheries, placed great dependence upon lower-priced fishery products for feeding purposes. These products were available at about one-third the cost of meat or dairy products used.

In the light of evidence obtained by various investigators and in the practical operation of governmental and State hatcheries, it appears that the protein content of the ration can be adequately supplied by a liberal use of fishery products especially for their stocks beyond the fry or juvenile stage of development. With this in mind,

the Bureau of Fisheries is making greater use of fishery products at some of its hatcheries, especially on the Pacific coast. Here a small reduction plant has been installed at one of its hatcheries to manufacture meal from spent salmon. Also at some of the other Bureau hatcheries and at some State hatcheries, carp and other varieties of fish are utilized.

### HORSE MACKEREL FISHERY OF MAINE

Increasing interest recently has been manifested in the horse mackerel fishery of Maine. It contributes a considerable share to the commercial fisheries of that State, and also the fish is much sought after by sportsmen. Also the fish is somewhat important to commerce because its liver is high in vitamins A and D. In view of this interest a report was prepared on the fishery by Walter H. Rich, the Bureau's agent at Portland, Maine. This has been published as Memorandum S–339, and has been widely distributed by civic and sportsmen's organizations in Maine.

### THE OYSTER AND OYSTER INDUSTRY

At the request of the Oyster Growers and Dealers Association of North America, Inc., an association representing the industry in the country, a paper was prepared by the writer on the biology of the oyster, methods of capture and handling, its food value, and recipes for preparing it for the table. This has been published by the Bureau as Fishery Circular No. 21. It is being used by the industry in its educational campaign to increase the consumption of oysters.

### COOPERATIVE MARKETING

The Seventy-third Congress approved, June 25, 1934, an act known as Public, No. 464, entitled "An act authorizing associations of producers of aquatic products." This act imposes various duties upon the Secretary of Commerce, which are in turn administered by the Bureau of Fisheries. In October 1935 the Bureau of Fisheries established a cooperative marketing unit in the Division of Fishery Industries, in charge of L. C. Salter, fishery economist, to have immediate supervision of administering this act. Since being established, a study has been conducted of the extent to which fishermen are organized and are acting through cooperative associations, as no compiled information was available regarding such activity in this country. Also, a study was made to learn to what extent States have enacted legislation pertaining to fishermen's associations, and whether the various States have encouraged the organization and operation of fishermen's cooperative organizations.

As a result of this work it was found that there are approximately 100 fishermen's organizations in the United States. Information has revealed that a large majority of fishermen's associations act in the capacity, or are similar to, labor unions and conduct protective functions such as matters pertaining to legislation, general labor conditions, and carry on negotiations with canners, processors, and other manufacturers with regard to fishermen's compensation, or in determining the prices of fishery products. For the most part, the associations are unincorporated and rather loosely organized, insofar

as our information has revealed. Inadequate finances and limited leadership are evidently prevalent. There are, however, some 12 or 15 associations that are conducting cooperative marketing activities of a commercial nature and in which the products of their fishermen members are received and sold, and in which certain processing functions may be conducted prior to selling. A few of the associations make financial arrangements for the extension of credit to members in supplying of foodstuffs, marine and fishery supplies and equipment.

Research regarding State laws pertaining to fishermen's associations indicates that limited legislation of this nature has been enacted. In no case has it been found that State legislation has been enacted which specifically authorizes associations of producers of aquatic products. By contrast, 47 States have specific State statutes authorizing associations of producers of agricultural products. In the 38 States in which commercial fishing is conducted, 13 States have laws that are of a general cooperative nature, under which fishermen may organize cooperative associations. A number of instances were found where the general corporation laws of States provide for nonprofit associations, and in all probability nonprofit associations may be organized by fishermen under the general corporation laws of most States. There are certain privileges or benefits that are usually conveyed by specific cooperative acts which are not usually enjoyed by associations set up under general corporation laws. However, the lack of specific cooperative statutes should not be a deterring factor in the organization of fishermen's cooperatives provided that other conditions are favorable.

Other work pertaining to fishermen's cooperative associations has been to learn something of the nature and extent of their functions. Questionnaires and circular letters seeking information along this line have been sent to associations, State departments of conservation, fishery commissions, and other State officials. This work is being continued, and it is expected that a complete report will be made in the near future regarding the nature and extent of the functions of fishermen's cooperative marketing associations.

When the cooperative unit was established by the Bureau information was furnished State departments and the fishery industry in general, acquainting them of the Bureau's proposed activities in the field of fishery cooperative marketing work. Many comments were received from over the country, expressing the need for, and anticipating the desirable effects of, this work. Numerous requests have been received from several commercial fishing areas that the Bureau spend some time in the cooperative work among fishermen. As fishermen themselves have become acquainted with the nature of this work, they have written the Bureau, depicting the depressed conditions existing in their markets and expressing the desire that the Bureau assist them in solving their marketing problems. Requests were received, also, for information pertaining to the organization and operation of fishermen's associations. As a result of these numerous inquiries and requests, the Bureau issued Special Memorandum No. 2600, entitled "Organizing and Incorporating Fishery Cooperative Marketing Associations", by L. C. Salter. This publication contains information regarding: (1) The aims and principles of fishery cooperaative associations; (2) procedure for organizing associations; (3) opera-

tion methods and policies; and (4) legal requirements and corporate structure. The publication contains, also, suggested legal forms and corporate papers for fishermen's marketing associations. Copies are available for distribution, upon request, by the Bureau.

In addition to the above, considerable assistance has been given to fishery cooperative associations and groups of fishermen interested in forming such associations.

## STATISTICAL INVESTIGATIONS

Fishery statistics are collected by the Bureau to serve two principal purposes—first, biological, and second, economic. For this reason the Bureau must plan its statistical surveys to obtain comprehensive data for furnishing a complete and reliable picture of the condition and trend of the fisheries. The collection and compilation of the great mass of data necessary, involves many problems. The fisheries are broad in scope, including over 160 varieties of aquatic products which enter into commercial production. These, many of which are migratory, are taken by a great variety of types of gear in water areas along our seacoast and in our interior lakes and streams. If the biological aspect is to be served, complete annual statistics are needed on each of these phases in every section. If the economic aspect is to be served, statistics are needed on not only the phases listed above relative to the biological aspect but also on the price structure, the processing function, and the marketing and distributing functions.

Statistics on these latter phases of the industry should be collected and published as soon as possible after the close of the business transactions in order to be of maximum value to the industry and others interested in the fisheries. However, because of limited funds and personnel, it has not been possible to collect and publish these figures as currently as desired. For the same reason it has not been possible to collect statistics on the fisheries of the entire United States on an annual basis.

### BIOLOGICAL ASPECT

The biological aspect must consider two problems—the conservation and sustained supply of the resource and the prediction of future trends or yield. Since our fisheries are usually prosecuted in areas not under private ownership, the problem of the conservation of these fisheries is of national concern. It, therefore, is important that close watch be kept of the condition of the various fisheries to detect depletion so that remedial measures can be promulgated timely and wisely. For this reason it is imperative that current statistical data be obtained on the yield of our fisheries.

These statistics then furnish the biologist with the background upon which to base his prediction of future trends and yields. This he does by coupling the statistical data with studies of the life history of the species. Difficulty is experienced in making these predictions because the supply (or population) of the species cannot be seen, as is the case with farm animals or crops. The more complete and more reliable the statistics on yield are, the better foundation the biologist has for conducting his studies. The Bureau, therefore, aims to obtain a complete picture of each individual fishery to further these biological studies.

## ECONOMIC ASPECT

With the fishery conserved and trends and yields of the fishery predicted there still remains the problem of supplying the fishery trade with the information so essential to the conduct of its business activities. In these days of increasing competition the very existence of the fishery industry must depend upon reliable economic statistical information. Such material has been especially valuable during the past few years, when it has been used in national planning. The Bureau, therefore, aims to make its statistical survey so complete that the industry and the various governmental organizations may turn to it for reliable fishery statistics.

## SURVEYS CONDUCTED

The statistical surveys during 1935 were conducted under the direction of Fred F. Johnson, Assistant Chief of the Division, aided by E. A. Power, assistant statistician. These surveys included the collection and dissemination of statistics of the commercial catch and its value, operating units, and employment in the fisheries. In addition, data were collected on employment and compensation of those engaged in, and products of, fishery wholesale and manufacturing establishments.

As previously mentioned, limited funds made it impossible to cover all the fishing areas of the country during the past year for 1934. However, the following areas were surveyed: Chesapeake States, South Atlantic and Gulf States, Pacific Coast States, and Lake States. Statistics of the fisheries of Alaska also were collected by the Alaska Division of the Bureau. Summaries of the production in those sections which were not surveyed during the year are included for the most recent years available in part 2 of this report.

In addition to the above, statistics were collected on the following special phases: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash. (published monthly); landings of halibut at North Pacific coast ports (published monthly); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of canned fishery products and byproducts of the United States and Alaska; transactions on the sponge exchange at Tarpon Springs, Fla.; volume of fishery products handled at the Municipal Fish Wharf and Market, Washington, D. C.; and the volume of the United States foreign trade in fishery products, furnished by the Bureau of Foreign and Domestic Commerce.

The following statistical and marketing agents assisted in the collection and compilation of the statistical data: H. F. Brown, W. H. Brown (deceased), F. F. Dimick, W. H. Dumont, R. L. Greer, V. E. Heffelfinger, B. E. Lindgren, W. H. Rich, V. J. Samson, C. B. Tendick, and A. S. Young.

The reader is especially referred to the section in the latter part of this report entitled "Statistical survey procedure" which gives in detail the methods employed in the collection of fishery statistics and other pertinent information.

## TECHNOLOGICAL INVESTIGATIONS

The fisheries constitute a vast source of raw materials for the products of many industries, including the food, drug, paint and varnish, farming (both of animal and plant foods), soap, and many others. Among the industrial commodities derived from aquatic products are: Adrenaline, acetone, agar, alginates, algin, alginic acid, ambergris, pearls, shells and shell products, buttons, salt products, caviar, fish skins and hides, marine leather, marine-animal oils and meals, coral products, epinephrin, fertilizers, glue, pearl essence, insulin, protamine insulinate and other glandular products, iodine, tortoise shell and ivory, isinglass, eelgrass paper, rubber compounds, seal fur, spermaceti, sponges, and many others of a diversified nature and with a wide range of usefulness. Thus it will be seen that technological research in the fisheries covers a broad field which necessarily involves the sciences of chemistry, engineering, bacteriology, pharmacology, and general technology toward the development of new processes and methods, the salvage of waste products, and toward the more complete utilization of the fishery harvest.

### LABORATORIES

During 1935, the Division carried on its technological studies under the direction of Dr. J. R. Manning, in charge of technological investigations, at its laboratories located in Washington, D. C., Gloucester, Mass. (later moved to College Park, Md.), and Seattle, Wash. In addition, certain cooperative investigations were conducted by members of our technological staff in the laboratories of the State Medical College at Charleston, S. C., Massachusetts State College at Amherst, Mass., George Washington University, Washington, D. C., University of Maryland and Maryland State Agricultural Experiment Station at College Park, Md., and Western Maryland College at Westminster, Md. On July 1, 1935, our technological laboratory located at Gloucester, Mass., was moved to College Park, Md., in space provided by the University of Maryland at no charge to the Bureau. This laboratory is equipped with all of the appliances which were formerly located at Gloucester, Mass., and is in addition to the nutrition laboratory which was already located at College Park, Md., in space in a separate building provided by the University of Maryland, also at no cost to this Bureau.

### PRESERVATION OF FISHERY PRODUCTS FOR FOOD

Experimental work during the past year in the preservation of fishery products for food was conducted at the Gloucester laboratory during the first half of 1935 and at the recently established College Park laboratory during the latter half of the year under the supervision of James M. Lemon, associate technologist in charge, assisted by Dr. Francis P. Griffiths, junior bacteriologist; Maurice E. Stansby, junior chemist; S. R. Pottinger, junior technologist; W. J. Hart, William B. Lanham, Jr., Willis H. Baldwin, Hillman C. Harris, Donald A. Bean, and Richard M. Locke, research associates and student assistants; and by Norman D. Jarvis, assistant technologist, in charge of experimental canning research in the Washington laboratory. During the first 9 months of 1935, Dr. Griffiths was detailed

to conduct a series of cooperative bacteriological studies at the food products laboratory of the Massachusetts State College, Amherst, Mass.

### STUDIES DEALING WITH THE SPOILAGE OF FISH

Studies dealing with the spoilage of fish were continued, attempting to correlate chemical tests with the condition of the fish. Work was limited to two species, the cod and the mackerel. The former is representative of the nonoily fish and its spoilage proceeds in an entirely different manner than do such oily fish as mackerel. It was found that the ammonia content of cod increased fairly regularly with spoilage, and by determining the amount of ammonia present, a valuable auxiliary test for the freshness of cod was available to be used with the electrometric method described in previous reports, as applicable to haddock. It was found that a determination of free amino acids in cod, during spoilage while packed in ice, was of very little value in determining the relative freshness. This is due to the fact that amino acids break down into intermediate spoilage products which are later decomposed. It was found that there was a small initial rise in free amino acid content followed by a slow decrease. Hydrogen sulfide determinations were also found to be of limited value as a test of freshness in cod. In a few cases, significant amounts of hydrogen sulfide were formed, but as a rule, the amounts were almost negligible.

In the case of mackerel, it was found that a determination of the hydrogen sulfide content of the flesh was frequently a good index of the degree of spoilage present. Mackerel frequently feed upon a variety of minute shellfish known to the fishermen, because of the peculiar orange-red color, as "red feed." It was found that fish which had consumed large quantities of the "red feed" upon decomposition gave off considerable quantities of hydrogen sulfide. In some cases, 24 hours after having been caught, appreciable amounts of hydrogen sulfide were found in the flesh of such fish.

In the case of mackerel, the deterioration of the oil must be taken into account. In order to be able to follow the changes occurring in this oil without interference of the protein of the flesh, the oil was extracted from the mackerel and stored under different conditions of temperature and surroundings. It was found that a determination of the peroxide value of the oil could be correlated with the degree of rancidity present if the storage temperature was less than about 65° C. At higher storage temperatures, this method is not applicable. A determination of the free fatty acid content of the oil is in some cases of some value but this test is far less sensitive than the peroxide test. It was found that oil samples stored in a vacuum showed no evidence of deterioration after 1 year's storage. When stored in the presence of carbon dioxide, the rate of oxidation of the oil was retarded. It was found that maleic acid, which is sometimes used for retarding decomposition of oils, had no effect when applied to mackerel oil, but hydroquinone greatly decreased the rate of oxidation of mackerel oil. Enzymes tend to facilitate the oxidation of the oil and, therefore, a preliminary treatment to destroy enzymes decreased the rate of oxidation of the oil, especially at low storage temperatures, but oxidation still proceeded at an appreciable rate.

A quick method for determining the condition of the oil present in fish flesh was developed. This method involves an extraction of the oil by shaking the flesh with ether and sodium sulfate, a process which eliminates the decomposition of the oil usually encountered in the ordinary methods of oil extraction. The extracted oil is then available for chemical tests such as a determination of the peroxide number. The method is suitable for a rapid determination of the oil content of the fish.

### ELECTROMETRIC TESTS FOR FRESHNESS OF COD AND POLLOCK

In May 1933 a report was published dealing in considerable detail with a method developed in the laboratory for the determination electrometrically of the relative freshness of haddock.[3] It was stated in that paper that it would be necessary to complete a series of actual tests in order to establish an accurate index which would make the test applicable to other species. During the past year, this was done in the case of cod and pollock showing that the method is applicable for testing the relative freshness of these species.

### STUDIES ON SMOKING FISH

A few preliminary studies were begun to determine the effect of the chemical nature of wood smoke relative to its preservative effect upon fish. Sawdust was heated in a combustion furnace and the resulting smoke collected and analyzed. As yet, not sufficient results have been obtained to draw any conclusions.

### STUDIES OF RANCIDITY IN FISH

As mentioned in previous annual reports of this Division, our technological staff has been much interested in the causes and prevention of the development of rancidity in fatty fish. Especially has this been a problem in connection with the cold storage of such oily fish as mackerel. As facilities were available and as time would permit, our technologists worked on this problem. Because of the limitations of our facilities and the size of our staff, very little time could be given to this project and its study was pursued only intermittently and in connection with the study of other research problems which were affected by it.

However, late in 1935, the Musher Foundation of New York City, a privately endowed research agency and technical consulting organization, became much interested in the published reports of our technologists bearing on the problem of rancidity in fish. Since the Musher Foundation had also made considerable study of this problem as related to fish and other foods, arrangements were made for a cooperative investigation in our laboratories and research associates were employed by the Musher Foundation to carry on this work. The first phase of the project has consisted of tests of the value of various cereal flours, such as oat and rice flour, as inhibitors of the development of oxidation or rancidity in fatty foods. These cereal products had already been shown to be of value for preventing or

[3] "An electrometric method for detection of relative freshness of haddock", by Maurice E. Stansby and James M. Lemon.

retarding the development of rancidity in other oil-bearing or fatty foods, such as salted peanuts, potato chips, and others and it was decided to determine whether they also would be effective in the preservation of several fish, including Boston mackerel, Spanish mackerel, haddock, and mullet. W. J. Hart, research associate for the foundation, was stationed in our College Park technological laboratory for conducting this work. Since the experimental work was not begun until the last of the year, it is too early to report any conclusive results. As described elsewhere in this report, Lyle Anderson, another research associate for the foundation, was stationed in our Seattle technological laboratory to make similar tests of these cereal products on fish livers, fish-liver oils, fish meals, and other miscellaneous byproducts.

### CHEMISTRY OF FISH PROTEINS

Because little is known regarding the chemistry of proteins in fish and shellfish and because this information is badly needed to add to the general knowledge of the food value of these products, a study of this subject was undertaken during the past year. Accordingly, late in 1935, determinations were started at our College Park laboratory of the four nutritionally important amino acids in some of the commercially important fish and shellfish. The amino acids being thus studied are: Cystine, lysine, histidine, and tryptophane. At the same time, digestibility and metabolism experiments with white rats were inaugurated in our nutrition laboratory at College Park to determine, or to learn more about, the biological value of these proteins simultaneously with the study being conducted on the chemistry of such proteins. Also, arrangements for cooperative research were made with Western Maryland College, Westminster, Md., for participation in that part of the program relative to the study of the chemistry of the proteins. Miss Thelma Chell was employed by the Bureau as a part-time graduate student assistant to aid in this work, and the college donated the services of three undergraduate student assistants as its contribution to the cooperative study. In addition, the college provided, free of charge to the Bureau, laboratory facilities, equipment, and chemicals, and the work is being conducted at Western Maryland College under the supervision of Prof. Samuel B. Schofield, head of the chemistry department.

Considerable difficulty was encountered at first in the determinations of the chemical constituents of the fish proteins as very little work has been done on this problem. It, therefore, became necessary for our technologists to modify existing chemical methods or technique (which have been worked out primarily for amino acid determinations of agricultural foods) so as to make them more adaptable to fish. The development of new technique also has been necessary to a certain extent. Therefore, progress on this project necessarily has been slow. However, many determinations have been made of the four above-mentioned amino acids in cod, haddock, mackerel, and Spanish mackerel, but the work has not progressed yet to a point where definite results can be reported. However, there is reason to believe from the data available, that the protein of fish will supplement the deficiencies in other types of protein.

## CANNING AQUATIC FOODS

As discussed in the 1934 report of this Division, our general program of the development of suitable and safe methods of home canning various commercially important fish and shellfish has been continued. During the past year, two reports on this work have been prepared. One is Fisheries' Memorandum S-338, entitled "Home Canning of Fish", by Norman D. Jarvis, assistant technologist, and Dr. Francis P. Griffiths, junior bacteriologist. The other report is entitled "The Home Canning of Fishery Products", by Norman D. Jarvis and Francis P. Griffiths. This latter report was published as Fisheries' Investigational Report No. 34, early in 1936. It contains methods recommended for canning salmon, shad, mackerel, lake trout, whitefish, mullet, clams, shrimp, and various fish specialties.

In addition, experimental packs during 1935 have included clam chowder, clam broth, canned cooked salt mackerel (plain and in tomato sauce), mackerel tuna style, mullet in tomato sauce, concentrated salmon chowder, crab gumbo, and crab creole. With respect to these latter two products, there is still the problem of discoloration when an attempt is made to pack the crab meat straight, that is, without any other ingredients or mixtures. Therefore, attention was devoted to working out formulae and methods for products in which crab meat forms only a portion of the contents and the possibility of discoloration of the finished product is correspondingly reduced. Success in eliminating discoloration of canned crab meat has been found in the development of such canned products as deviled crab, crab gumbo, and crab creole. Prospects seem favorable for developing methods suitable for canning at least two of these products on a commercial scale.

Some experimental packs of razor clams received from New England have been made. From preliminary data, it appears that a canned minced clam of good quality can be prepared from the New England razor clam. This shellfish at present is used only as fish bait.

During the past year, a study was begun of existing commercial methods for canning aquatic products with the view toward bringing up to date in a compact report the best technical information available on the subject. As this report will cover a wide field, the compiling of the data will require considerable time to complete.

During the latter part of 1935, our technologist in charge of experimental canning was detailed to assist the North Carolina Fisheries, Inc., Morehead City, N. C., a cooperative organization of North Carolina fishermen, in constructing and operating equipment in their plant for the handling and preservation of fish. This included assistance in developing methods and equipment for handling fresh fish, the smoking and salting of fish, and the canning of fishery products.

## BACTERIOLOGICAL STUDIES

Our bacteriological studies have been closely correlated with other investigations of our technological staff as many of these problems require a knowledge of the action of bacteria. These bacteriological investigations have included examinations of the experimental packs of canned fishery products to determine which processes produce

sterility, studies of the role of bacteria in the different types of decomposition or spoilage described in preceding paragraphs, with special reference to the studies on mackerel, determinations of the effectiveness of formaldehyde and other chemical preservatives in preventing or retarding the development of bacterial spoilage in fishery byproducts, and other miscellaneous bacterial control problems.

### BACTERIAL DECOMPOSITION IN FRESH FISH

The growth of bacteria in flesh foods is one of the most difficult to control. It is probable that this type of spoilage is more costly to the fishing industry than that which takes place within the flesh of the sea food and designated as autolytic or chemical. In view of this, the Bureau has conducted bacteriological tests in an effort to retard this type of spoilage. During the year, Dr. F. P. Griffiths, bacteriologist of the Division, cooperated with Dr. James E. Fuller, professor of bacteriology at Massachusetts State College, in an effort to determine the bacterial flora most commonly found in the contamination of market fish and fillets. The results of this investigation indicate that freshly caught fish which were handled according to approved sanitary methods were not contaminated with *Escherichia Coli*, while fish and fillets which were carelessly handled were found to be contaminated by these organisms.

The results further indicate that fillets were more likely to be infected than round or eviscerated fish. This is to be expected since the skin of the fish is not easily penetrated by ordinary bacterial contamination. Bacteria generally enter the flesh of fish through incisions in the skin such as those made by cutting or forking the fish. It is believed that a combination of the test for *Escherichia Coli*, total bacterial count and the chemical test of freshness index, would prove to be highly satisfactory measures of the sanitary quality of fishery products.

The results of this investigation were presented at the American Public Health Association meeting in October 1935, in a report entitled "Detection and Significance of *Escherichia Coli* in Commercial Fish and Fillets", by Francis P. Griffiths and James E. Fuller. This report was published in the American Journal of Public Health, issue of March 1936.

### DISINFECTANTS FOR SPONGES

At the request of the sponge industry two student assistants employed by the National Youth Administration were assigned through the courtesy of George Washington University, Washington, D. C., in 1934, to develop a simple and inexpensive disinfectant which could be used for sterilizing sponges after use. This study was carried on during 1935 in the laboratories of George Washington University as a cooperative investigation of this Bureau and that institution. A disinfectant, consisting of a mixture of formaldehyde, phenol, and chlorine solution, has been found to be effective in sterilizing sponges for the purpose described above.

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## PHARMACOLOGICAL STUDIES

Because of the increasing importance of the role of some minerals in the metabolism of man and his domestic animals, and because much discussion had appeared in scientific and trade journals concerning the effect of these minerals in human and animal nutrition as they naturally occur in foods such as fishery products and as they occur in organic form, it has become necessary for the Division to conduct investigations in this field. Accordingly, late in 1935, an assistant pharmacologist was appointed to our technological staff; and his work thus far has been in the pioneer development of a new applied science, namely, that of the pharmacology of fishery products. Up to the present, studies have been made of the metabolism of arsenic and copper as they occur naturally in fish and shellfish. As a result of this work, a report was published in the Journal of Nutrition, vol. 10, no. 3, September 1935, entitled "Metabolism in the Rat of the Naturally Occurring Arsenic of Shimp as Compared with Arsenic Trioxide", by E. J. Coulson, assistant pharmacologist, United States Bureau of Fisheries, and Dr. Roe E. Remington and Dr. Kenneth M. Lynch, Medical College of the State of South Carolina, Charleston, S. C.

Investigations of the characteristics of the organic arsenic compound of shimp, including actual feeding tests with both rats and with man, have shown that this compound is very readily absorbed from the gastrointestinal tract, but it is rapidly and almost completely eliminated by the kidneys. Control tests using inorganic arsenic in the form of arsenic trioxide, indicate that this form of arsenic, on the other hand, is absorbed and stored.

The retention of the inorganic arsenic compound was as high as 80 percent during the initial period of feeding. A study of the chemical characteristics of the arsenic compound of shrimp has shown that it is a very stable compound in which the arsenic atom is not ionized. In other words, the arsenic is not in an active state. Thus the arsenic compound of shrimp closely resembles the organic arsenic derivatives of the fatty series which are said to be so stable as to lack something of the therapeutic activity shown by the more dynamic compounds derived from the benzene series, such as atoxyl and salvarsan. The arsenic compound from shimp is soluble in water and readily diffuses through a collodion membrane. It is also soluble in ethyl alcohol and methyl alcohol but insoluble in ether, acetone, and chloroform. The stable, undissociated characteristic of the organic arsenic compound of shrimp and its ready solubility in water, without doubt, account for the rapidity with which it is eliminated from the body.

Thus, there need be no fear of any cumulative toxicity resulting from the organic arsenic as it occurs in shrimp. While the subject has not yet been investigated, it would appear that similar results might be expected from the organic arsenic of other fish and shellfish.

Like studies on the effect of feeding organic copper in the form of "coppery green" oysters have yielded similar results.

This new field of the pharmacology of fishery products promises to yield interesting and important results in future years and in one aspect is closely related to the role of mineral elements in human and animal nutrition. It is no longer safe to evaluate the relative metabolism or assimilability of the mineral content of foods by chemical analyses alone.

## PRESERVATION OF FISHERY BYPRODUCTS

The demand for information on the economic utilization of fishery waste materials is increasing. For this reason during 1935, our technologists continued an active investigational program on the preservation of fishery byproducts. Some of these projects were conducted in the Seattle technological laboratory under the direction of R. W. Harrison, associate technologist in charge of that laboratory, with the assistance of A. W. Anderson, assistant technologist, and Lyle Anderson, research associate appointed by the Musher Foundation. Other byproducts investigations were carried on in the Gloucester laboratory and later in the Bureau's College Park laboratory under the supervision of J. M. Lemon, in charge of that laboratory, by S. R. Pottinger, junior technologist, and George Tarrant, Harold E. Crowther, and Joseph F. Puncochar, research associates appointed by L. T. Hopkinson, Washington, D. C. Mr. Tarrant has chemical training and Messrs. Crowther and Puncochar are bacteriologists. These various investigations are described in succeeding paragraphs.

### UTILIZATION OF SALMON CANNERY WASTE

Approximately 200,000,000 pounds of salmon waste are at present discarded each year. Complete utilization of this material would provide the basis for an industry which would manufacture products having a value exceeding $1,000,000 annually.

In the past, numerous attempts have been made toward utilization of this material but in only a very few cases were the efforts successful. Many of these failures can be attributed to a lack of understanding of the reduction problem as required by salmon waste and also to a lack of appreciation of the potential value of salmon byproducts. Nevertheless a psychological state of mind has arisen which has retarded further attempts of development on the part of the industry.

Realizing the great benefit the United States and Alaska would derive from an industry of the magnitude indicated by the amount of salmon waste material available and appreciating the effects of past experiences of the industry, the Bureau has continued its investigation of the problem with considerable deliberation and caution, in order to assure a sound basis for future development.

In this connection our technologists have endeavored to investigate those phases of the reduction problem which caused difficulty in the past, have worked on methods for overcoming these obstacles, and are continuing a comprehensive study of the potential value of the manufactured products which may be expected as a result of proper operating methods.

In our last report information was given with respect to the distribution of fat and vitamins in salmon waste, the potential value of each species and progress on specific specialized products. These data have provided the industry with certain fundamental facts concerning the relationship of the nature of the raw material to the quality of the products to be obtained, as well as a guide to the possibilities and limitations of specialized operations.

Subsequent investigation has dealt largely with the reduction process and its relationship to the efficiency of salmon waste utilization.

These studies have indicated that effective cooking can be accomplished without detriment to vitamins in the oil, have established the feasibility of screening and mechanically separating salmon press liquors, and have demonstrated means of improving both oil recovery and the vitamin potency of the oil.

At the present time, attention is being given to a study of the retention of vitamins A and D in the oil in salmon meal. If methods can be developed whereby the fat in the meal can be prevented from becoming rancid, and vitamin A and D values retained during storage, it would be entirely possible to produce salmon meals which would carry sufficient vitamin A and D unitage to preclude the necessity of adding any further supplement of these vitamins to the diet. Meals of this type would be expected to carry a higher vitamin G value also and would thus be of unusual value in poultry feeding. All such work on fish meal also is valuable in rendering this product more suitable for feeding fish reared in hatcheries.

## MANUFACTURE AND NUTRITIVE VALUE OF NONOILY FISH MEALS

Previous issues of this publication have carried progress reports of an extended investigation dealing with the manufacture of fish meal from nonoily fish waste and the effect of manufacture on the composition and nutritive properties of these meals. During the past year the assembled data were incorporated in report form and published in the Investigational Report series of the Bureau. Since these papers are now available to the public, interested persons are referred to the following publications obtainable from the Government Printing Office: Fisheries' Investigational Report No. 30, entitled "Effect of Manufacture on the Quality of Nonoily Fish Meals"; Fisheries' Investigational Report No. 31, entitled "Effect of Method of Manufacture on the Composition of Haddock Fish-Meal Proteins"; and Fisheries' Investigational Report No. 32, entitled "Studies on Drying Cod and Haddock Waste."

## PREPARATION OF AUTHENTIC HALIBUT-LIVER OIL SAMPLES

During the year, the Bureau was asked by the Food and Drug Administration and the Bureau of Chemistry and Soils to prepare a number of authentic halibut-liver oil samples extracted from livers of halibut taken in different localities at intervals throughout the fishing season. The work was arranged and carried out through our Seattle technological laboratory

Eight liver samples were taken from an area bounded on the south by Cape Shoalwater, on Willapa Harbor, and on the north by Cape Spencer, in Southeastern Alaska, designated as area 2 by the International Fisheries Commission. Ten samples were taken from area 3, the area between Cape Spencer and Cape Sagak in the Aleutian Islands and two samples from the small area south of area 2.

The livers from area 2 varied in fat content, as indicated by ether extraction of samples of liver which had been desiccated under reduced pressure, from 22 to 42 percent, the majority being around 30 percent. Samples were taken at intervals between July and November, inclusive. The livers from area 3 varied in fat content as determined above between 13 and 31 percent. Sampling extended

from July to January 1, 1936. The two remaining samples contained 14 percent and 25 percent fat.

Although not consistent, the data indicate that halibut livers increase in fat content from summer to mid-fall and then decrease to the close of the season in November or December. Preliminary data on samples of oil tested in the laboratory indicate variation in certain chemical constants and vitamin A values ranging through wide limits. A more complete study is being made.

### EXTRACTION OF OIL FROM HALIBUT LIVERS

Halibut livers do not give up oil by simple heat treatment, as do the livers of cod and related fish. For this reason, solvent extraction was used in the first stages of the industry's development. During the past 3 or 4 years, the several manufacturers of halibut-liver oil have developed effective methods of oil extraction without recourse to solvents, with a resultant improvement in the quality and appearance of the oil.

In order that the oils referred to in the preceding section would be representative of the grade of oil entering commerce at the present time our technologists were required to give considerable attention to methods of extraction. Most effective and rapid results were obtained by first disintegrating the livers mechanically without emulsification, autoclaving for a short time in an acid medium to break down further the liver tissue, making the solution slightly alkaline, and reheating for a short period and centrifuging.

The livers were found to vary considerably in physical condition and consequently with ease of extraction. For this reason further discussion of the experimental procedures used and their efficacy will be reserved for our regular report series where they can be discussed in detail at the completion of the investigation.

### VARIATION IN THE FAT CONTENT OF HALIBUT

On several occasions during the past year the bellies of halibut held for storage were observed to become bluish and more or less mottled in appearance when frozen. Such fish were considered unmarketable by the trade since the bellies of frozen halibut are expected to be unblemished white in color.

Specimens of such fish were submitted for the attention of the technologists in our Seattle laboratory, and it was found that the discolored appearance was due to the belly skin becoming more or less transparent when the fish were frozen. This resulted in the flesh immediately beneath the skin showing through. Upon further examination and laboratory tests the fish were found to be particularly lean with practically no fat storage adjacent to the belly skin as is the case in a normal fish.

Since this extreme variation in fat content had resulted in marketing losses and has possible relation to the biological work of the International Fisheries Commission in the study and regulation of the halibut fishery, our Seattle technological laboratory began an investigation of this problem in cooperation with the commission. Periodic samples of small, medium, and large halibut have been taken at intervals throughout the season, from the various halibut

grounds and are being examined for fat content. Sufficient data are not as yet available to warrant discussion at this time.

### FISH FOOD FACTORY

As mentioned previously in this report the increasing costs of animal livers, hearts, spleens, and other slaughter wastes used as fish foods has given rise to a financial problem in hatchery operation. During the past year the Bureau's Division of Fish Culture became interested in the possibility of preparing supplemental dried food from spent salmon after egg taking, which would permit a reduction in raw food requirements. In this connection, the technologists in our Seattle laboratory were called upon to cooperate in designing and preparing specifications for a factory which was installed at the Bureau's Quilcene, Wash., hatchery. This was operated during the past egg-taking season and handled in a satisfactory manner the prescribed amount of approximately 1½ tons of raw fish per day. The output of the factory is being used regularly in the ration of fish reared at various Bureau hatcheries at a considerable saving to the Bureau for fish foods.

### RANCIDITY STUDIES OF HALIBUT LIVERS, LIVER OILS, AND OTHER FISHERY BYPRODUCTS

Beginning November 1, 1935, the Musher Foundation, Inc., of New York, appointed a research associate in our Seattle laboratory, for the purpose of studying the prevention of rancidity and general deterioration of fish-liver oils, fish oils, and other fishery byproducts by the treatment or incorporation of especially prepared cereal flours for which the foundation holds patents. The laboratory work which is being done by a graduate student of the University of Washington under the direction of the technologist in charge of the laboratory, has not yet reached the stage where any conclusions can be drawn.

### CHEMICAL PRESERVATION OF FISH WASTE

Fish waste and waste fish, usually resulting from the operation of fishery industries primarily engaged in the manufacture, preparation, and preservation of various edible fishery products for food, have in many cases gone unutilized and sometimes also have presented a disposal problem because not enough of the trimmings or waste would be available to justify the cost of installation and operation of suitable byproducts equipment for converting this raw material into such useful commodities as fish meal, fish oil, etc. In view of this, much interest is being shown in the possibilities of partially or temporarily preserving this waste until it can be collected at a central point for mechanical reduction into meal, oil, and other byproducts. Therefore, late in 1935, a cooperative investigation of the value of certain chemicals in the preservation of fish waste was undertaken by our technologists in our College Park laboratory with L. T. Hopkinson, Washington, D. C., who had developed certain methods for the application of these chemicals on board ships. Accordingly, three research associates were employed by Mr. Hopkinson to carry on this project under the general supervision of our technological

staff. These research associates are: George E. Tarrant, chemist, and Harold E. Crowther, Joseph F. Puncochar, bacteriologists. Chemical data are being obtained to determine the effectiveness of the chemicals being studied and their chemical reactions on the protein and other ingredients of the fish waste and bacteriological studies are being undertaken to determine the effectiveness of these chemicals and in preventing or retarding bacterial spoilage.

Among the chemicals which have been studied thus far are formaldehyde and acetaldehyde. This work has not progressed to a point yet where any definite results can be reported. The effect of chemical preservation on the feeding value of fishery byproducts is being tested with farm animals at the Virginia State Agricultural Experiment Station, Blacksburg, Va., and with experimental animals in our nutrition laboratory at College Park, Md.

## NUTRITIVE VALUE OF AQUATIC PRODUCTS

Since a large part of our technological investigations is devoted to food research, studies of the various nutrition or food factors in aquatic products are an essential and important part of our investigative program. In fact this phase of our program must be closely coordinated with other technological investigations as the relative nutritive value of experimentally prepared and preserved fishery products is the only true yardstick or standard of measurement for evaluating improvements in methods of manufacture, preservation, handling, and storage of such products.

During 1935 our nutrition investigations were carried on in our College Park laboratory, in the laboratories of the State Medical College, Charleston, S. C., and in the laboratories of the Massachusetts State College, by Charles F. Lee, E. J. Coulson, and Dr. Francis P. Griffiths, of the technological staff, and by student assistants.

### FISH-LIVER OILS

Most of the work in our nutrition laboratory at College Park, Md., consisted of studies of the content of vitamins A and D in experimentally prepared fish-liver oils forwarded from other technological laboratories of the Bureau. These liver oils consisted of halibut, swordfish, haddock, and salmon. Several series of samples of oils from cooked and uncooked swordfish livers were examined to determine the effect of different solvents, used in extracting the oils from the livers, on the vitamin potency of the extracted oils. It was found that such solvents as petroleum ether, ethyl ether, and ethylene dichloride, produced the best oils.

The tests of the effect of these solvents on the vitamin potency of extracted oil proved to be very accurate because in three cases where livers were extracted several times with the same solvent, the oils derived from each fraction were identical in vitamin content.

Twenty-three samples of salmon oils prepared by our temporary technological laboratory in Alaska during the summer of 1934 were studied for their content of vitamins A and D. Tests also were made on 13 salmon oils, being used at the same time in poultry feeding tests in Washington State College in a cooperative project with this Bureau. These salmon oils varied over a wide range in vitamin potency from 120 to about 900 international vitamin A units per

gram for the oils prepared in Alaska and from 110 to 2,400 international vitamin A units per gram for the oils in the group from Washington State College. The vitamin D potency of the oils in both groups ranged from 40 to 120 international vitamin D units per gram. This average was somewhat lower than the vitamin potency reported for salmon oils previously tested and reported in previous annual reports of this Division.

As described previously in this report, the Bureau's technologists, during 1935, began a cooperative study of halibut-liver oils at the request of the Bureau of Chemistry and Soils and the Food and Drug Administration of the United States Department of Agriculture. Chemists of both of these Bureaus are working with our technologists, and the purpose is to standardize the production and testing of halibut-liver oil so that authentic samples may be available for control work in administering the food and drug laws.

Therefore, our nutrition laboratory determined the content of vitamins A and D in eight samples of halibut-liver oil experimentally prepared by our Seattle laboratory in connection with this cooperative project. It is expected that it will be necessary to assay about 20 halibut-liver oil samples to complete the study. Incomplete tests on the first eight halibut-liver oil samples show considerable variation in vitamin A content with the highest sample running about 90,000 international vitamin A units per gram and other samples ranging down to less than 30,000 units. Vitamin D potencies of these oils ranged from 2,000 to 3,000 international units per gram.

The investigation of the chemical and physical properties and vitamin potency of haddock-liver oil begun in 1934 was completed during the past year. The results of this study were published in Fisheries' Investigational Report No. 27, entitled "Chemical and Physical Properties of Haddock-liver Oil and Its Vitamin Content." In brief, this study indicated that the U. S. P. requirements should be changed as to haddock-liver oil if this oil is to be included in cod-liver oil along with the liver oils from other members of the family Gadidae.

### MENHADEN OIL FOR POULTRY FEEDING

In cooperation with the chemistry department of the University of Maryland, an investigation was undertaken to determine the possibility of using menhaden fish oil in poultry feeding. Menhaden fish oil is produced by one of our large domestic fishery industries in factories along our Atlantic coast. Several samples of menhaden oils from various factories were tested for vitamin D content on white rats and also on baby chicks. These oils, although not especially prepared to preserve their vitamin potency, were with few exceptions equal to cod-liver oil in vitamin D content and, therefore, are of great value in poultry nutrition. Such oil now goes into the soap kettle and into other industrial uses. A report on these tests entitled "Menhaden Oils as an Antirachitic Supplement for Poultry", by W. C. Supplee and Charles F. Lee, has been published as Bulletin No. 389 of the University of Maryland Agricultural Experiment Station.

### MENHADEN FISH MEAL IN CATTLE FEEDING

In a cooperative arrangement with the Bureau, the dairy department of the Maryland State Agricultural Experiment Station began,

in 1934, an investigation of the value of menhaden fish meal in the feeding of calves and yearling heifers. Menhaden fish meals, prepared according to different methods of manufacture, have been obtained for this test from various factories. Results thus far have indicated that both flame-dried and steam-dried menhaden meals are valuable ingredients in the dairy ration. A full report on this work will be published by the Maryland State Agricultural Experiment Station and this Bureau in the Journal of Dairy Science.

### STUDIES OF THE CHEMISTRY AND NUTRITIVE VALUE OF FISH PROTEINS

As discussed in a previous section of this report, our College Park laboratory, late in 1935, began a study of the constituents of fish proteins. This project not only includes a determination of the nutritionally important amino acids in the proteins of various species of fish and shellfish, but also digestibility and metabolism studies have been begun in our nutrition laboratory to determine the biological value of these proteins. As indicated previously, this work has not progressed to a point where any results can be reported.

### NUTRITIVE VALUE OF MACKEREL

A preliminary study of the nutritive value of the edible portion of mackerel was made during 1935 by William H. Conway, Jr., in the food products laboratory of the Massachusetts State College, Amherst, Mass., in cooperation with our technological staff. This work was supervised jointly by Dr. C. R. Fellers, of Massachusetts State College, and Dr. F. P. Griffiths, of the technological staff. Mr. Conway, a student assistant, was assigned to this study by the National Youth Administration through the courtesy of the Massachusetts State College. The results of this investigation are reported in a thesis entitled "Studies on the Nutritive Value of Mackerel", by William H. Conway, Jr., and submitted to the college. It was found that mackerel is a good source of protein and that mackerel flesh is a fair source of vitamins A and D, although not quite as good a source of these vitamins as some other fish.

### MINERAL CONSTITUENTS IN FISHERY PRODUCTS AND BYPRODUCTS

During 1935, E. J. Coulson, of our technological staff, stationed in the laboratories of the State Medical College, Charleston, S. C., continued his study of the mineral constituents in various fishery products and byproducts. This work not only included chemical determinations of the amount of these various mineral constituents in the different products studied, but also included tests of the nutritive value of these minerals with experimental animals. Determinations of the iodine content of most of the important products were completed and the results were published in Fisheries' Investigational Report No. 25, entitled "The Iodine Content of Some American Fishery Products." This report contains determinations of the iodine content of about 25 kinds of fishery products.

Studies of the iodine of haddock flesh and oysters, as compared with the iodine of milk and iodine in the inorganic form of potassium iodide

indicated that the iodine from these various sources was equally assimilable and that the effectiveness of iodine from these sources, when fed at minimum effective doses, was about equal in the prevention of goiter in the white rat, the experimental animal utilized in these tests.

Determinations of other mineral constituents in fishery products, such as calcium, phosphorus, iron, copper, etc., are being made as rapidly as possible, and it is hoped that enough data will be available for publication in 1936. Other chemical and biochemical studies of these mineral constituents are discussed in a preceding section of this report under "Pharmacological studies."

## FISH COOKERY STUDIES

Our fish cookery laboratory continued the development and testing of recipes for various fishery products begun in 1934. The cookbook, referred to in previous reports of the Division, was completed and published as Fishery Circular No. 19, entitled "Practical Fish Cookery", by Agnes I. Webster and W. T. Conn. The demand for this cook book has exceeded the supply. However, through the cooperation of the Fish and Seafood Institute of the United States, over 60,000 copies have been distributed, mainly to home economics workers in schools and colleges. In addition to this work, our fish cookery expert carried on educational work and practical demonstrations in the preparation and cooking of fish and shellfish in cooperation with home economics workers in various cities. During the latter part of 1935, she was detailed to cooperate with R. H. Sullivan, of the Massachusetts State Department of Agriculture, in carrying on demonstrations in fish cookery and giving educational talks on the nutritive value of fish at schools, women's clubs, and various other gatherings in the State of Massachusetts.

In cooperation with the manager of the large cafeteria in the Department of Commerce Building in Washington, seafood dishes, popular in many public eating places, were prepared on a large scale and sold through the cafeteria under such an arrangement that constructive criticisms and suggestions were received from patrons. From this test, it was possible to obtain a wide popular reaction to the results of the Bureau's fish cookery work. Much favorable comment was received from this test and the cafeteria manager reported that it had stimulated sales of fish and shellfish dishes. As the result of this practical test and other laboratory tests of recipes on a large scale, a mimeographed pamphlet or cookbook was issued by the Bureau of Fisheries as Special Memorandum 3216, entitled "Cooking Fish For One Hundred", by W. T. Conn, technologist.

## RESEARCH ASSOCIATES AND STUDENT ASSISTANTS

Because of the relatively small size of the Bureau's technological staff and the rather broad field of research it must cover, it is only possible to undertake those problems which are of a fundamental nature and which promise to be of the greatest value to the largest number of persons (whose livelihood depends in whole or in part on the fisheries), and which are possible with the funds and personnel

available. For this reason, the Division cannot, with present facilities, attack problems of special or restricted interest affecting certain products, processes, methods, or industries. However, the Bureau has available, by congressional authorization and under an arrangement similar to that of other scientific Government bureaus, facilities for research associates and student assistants in its laboratories. The salaries and expenses of these employees are paid by the firms or groups who are interested in the problems on which they are working and the investigations are carried out under the supervision of the Bureau's technologists in its laboratories and under its control. Thus the Bureau provides these industries and groups with laboratory, consulting, and library facilities which, in most instances, cannot be obtained elsewhere.

Within the limits of its facilities, the Bureau also has opened its technological laboratories to research students who are pursuing courses in universities and who are selecting investigational problems in the fisheries as their major study. This may prove of special benefit to the industry as it brings its problems to the attention of a large group of research workers who in turn may spread interest to applied fishery research.

The following research associates and student assistants carried on investigations under the supervision of our technological staff during the past year. The details of these problems have been described in the preceding pages.

In the Seattle technological laboratory, Lyle Anderson, research associate employed by the Musher Foundation, Inc., New York City, working on the problem of rancidity in fish livers, oils, and meals; Myron Thurman and Richard Crosby, student assistants, provided by the National Youth Administration, through the University of Washington.

In the College Park laboratory, W. J. Hart, research associate, employed by the Musher Foundation, Inc., New York City, working on the problem of rancidity in fatty fish; George Tarrant, Harold E. Crowther, and Joseph F. Puncochar, research associates, employed by L. T. Hopkinson, Washington, D. C., working on problems in the chemical preservation of fishery byproducts; William B. Lanham, Jr., Hillman C. Harris, and Willis H. Baldwin, part-time graduate student assistants, employed by the Bureau of Fisheries and working on problems in the chemistry and metabolism of fish proteins; James W. McCurley, Roscoe Dwiggins, Robert D. Nichols, G. E. Linthicum, Amiel Kirshbaum, Raymond N. Miskimon, George W. Dorr, H. H. Hemsley, C. R. Langmaid, George W. Knepley, Walter Schauffele, Wade Wood, Ned Oakley, Abraham Scop, A. N. Chumbris, K. Krulevitz, Edward J. Kennedy, John Webster, and T. M. Scharf, student assistants provided by the National Youth Administration through the University of Maryland.

In the laboratory of the State Medical College at Charleston, S. C., Cecil Leroy Smith, chemist, provided by the Works Progress Administration through the State Medical College and assisting Mr. Coulson of our technological staff in studies of the pharmacology and nutritive value of mineral constituents in fishery products.

At George Washington University, Washington, D. C., William H. Conway and William J. P. Howard, senior medical students provided by the National Youth Administration through the university and working on the problem of the development of disinfectants for sponges for household use.

At Western Maryland College, Westminster, Md., Miss Thelma Chell, graduate student assistant, employed part time by the Bureau of Fisheries and studying the chemistry of fish proteins; William F. Coleman, Miss Helen H. Frey, and Miss Louella H. Mead, student assistants provided by the National Youth Administration through Western Maryland College and assisting Miss Chell in her study of fish proteins.

During the first half of 1935 while the Division was maintaining a technological laboratory at Gloucester, Mass., the Bureau obtained from Northeastern University, Boston, Mass., for work in the Gloucester laboratory, Donald A. Bean and Richard M. Locke, student assistants, who spent alternately 5 weeks in the university pursuing the regular school curriculum and 5 weeks in our laboratory aiding in the conduct of research problems pertaining to fish preservation and spoilage.

At Massachusetts State College, Amherst, Mass., William H. Conway, Jr., student assistant provided by the National Youth Administration through the college and working on the study of the nutritive value of mackerel.

## EDUCATIONAL AND CONSULTING SERVICES

In addition to the activities described in this report, our economic and technological staffs conduct an educational and consulting service for those interested in the fisheries. Some of these functions and services have been discussed or referred to in previous paragraphs of the report. In addition, various members of the staff have conducted lectures and practical demonstrations relative to the fisheries and the fishery industries at various State educational institutions and at public gatherings of various sorts. Also, members of the staff deliver radio addresses on various fishery subjects from time to time. The Bureau or the Division also answered many thousands of letters on fishery subjects and has supplied information to persons who have called at the Bureau, personally. Many of the latter have come from foreign lands to seek information on the conduct of the fishery industries in the United States, which might be useful in the more orderly conduct of the fisheries of their native lands.

### FISHERY SCHOOLS OF INSTRUCTION

During the months of January, February, and March 1935, the division of markets of the Massachusetts State Department of Agriculture conducted schools of instruction in handling fish. The members of the staff of the Gloucester, Mass., technological laboratory cooperated with the State officials in this work. These schools were designed particularly for the instruction of the retail dealers of fishery products in the latest methods of sanitation and handling of these products. There were also included suggestions as to attractive methods of displaying and cooking the various species of fish and shell-

fish. The courses of instruction were conducted semiweekly in widely separated cities throughout the State. Considerable interest was shown by the industry and it is believed that the benefits derived were more than adequate to compensate for the effort.

## PUBLICATIONS OF THE DIVISION

During the calendar year 1935 the following publications were prepared and addresses delivered by members of the Division's staff. These do not include the monthly statistical bulletins of the landings of fishery products at Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish and quantities of fish frozen. The fishery reports and circulars may be purchased at the prices shown from the Superintendent of Documents, Government Printing Office, Washington, D. C. The statistical bulletins and special or S-memoranda are distributed free of charge upon request to the Bureau. The special articles may be obtained from the sources of publication.

Those wishing to receive current copies of this report and statistical bulletins issued by the Bureau should request that their names be placed on the Bureau's mailing lists nos. 128 for the annual statistical report, 128a for general statistical bulletins, and 128b for monthly cold-storage reports. Those desiring historical statistical data on the domestic fisheries for the period 1880 to 1929 should consult the report entitled "Fishery Industries of the United States, 1930", by R. H. Fiedler, Appendix II to the Report of the United States Commissioner of Fisheries for the Fiscal Year 1931. Statistical information for the years 1930 to 1933, inclusive, may be obtained from the annual reports of the Division for the years 1931 to 1934, inclusive.

### DOCUMENTS, REPORTS, AND CIRCULARS

ANDERSON, ANDREW W., ROGER W. HARRISON, and S. R. POTTINGER.
Studies on drying cod and haddock waste. 8°, 41 pp., 7 figs. Investigational Report No. 32. 5 cents.

COULSON, E. J.
The iodine content of some American fishery products. 8°, 7 pp. Investigational Report No. 25. 5 cents.

FIEDLER, R. H.
Fishery industries of the United States, 1934. 8°, 330 pp. Appendix II to Report of Commissioner of Fisheries, 1935. 20 cents.

HARRISON, ROGER, W., S. R. POTTINGER, CHARLES F. LEE, and ANDREW W. ANDERSON.
Studies on the utilization of swordfish livers. 8°, 10 pp., 3 figs. Investigational Report No. 28. 5 cents.

HARRISON, ROGER W., ANDREW W. ANDERSON, and S. R. POTTINGER.
Effect of manufacture on the quality of nonoily fish meals. 8°, 30 pp. Investigational Report No. 30. 5 cents.

JARVIS, NORMAN D.
Fishery for red snappers and groupers in the Gulf of Mexico. 8°, 29 pp., 4 figs. Investigational Report No. 26. 5 cents.

POTTINGER, S. R., CHARLES F. LEE, CHESTER D. TOLLE, and ROGER W. HARRISON.
Chemical and physical properties of haddock-liver oil and its vitamin content. 8°, 16 pp., 6 figs. Investigational Report No. 27. 5 cents.

POTTINGER, S. R., ROGER W. HARRISON, and ANDREW W. ANDERSON.
Effect of method of manufacture on the composition of haddock fish-meal proteins. 8°, 14 pp., 1 fig. Investigational Report No. 31. 5 cents.

WEBSTER, AGNES I., and W. T. CONN.
Practical fish cookery. 8°, 26 pp. Fishery Circular No. 19. 5 cents.

## SPECIAL ARTICLES AND ADDRESSES

CONN, W. T.

Cooking fish for one hundred. Bureau of Fisheries' Special Memorandum 3216.

Florida fish on the table. Address before the Women's Institute at the Florida State College for Women, June 19, 1935, Tallahassee, Fla.

Acres of diamonds. Address at the annual meeting of the Florida Fisheries Association, June 24, 1935. Orlando, Fla.

Problems of the Florida fishermen. Address at the State Convention of the Union Fishermen of Florida, Dec. 10, 1935. Sarasota, Fla.

The natural craving for seafood. Radio address delivered over Station WJAX, Dec. 16, 1935. Jacksonville, Fla.

COULSON, E. J.

The elimination of arsenic from shrimp, and inorganic arsenic in man and in the rat. Address before the Chemistry Section, South Carolina Academy of Science, Columbia, S. C., April 6, 1935. Abstracted in Bulletin of the South Carolina Academy of Science, vol. 1, 1935.

Associate referee's report on copper. Address before the General Section of the Association of Official Agricultural Chemists, Washington, D. C., November 11, 1935.

COULSON, E. J., ROE E. REMINGTON, and KENNETH M. LYNCH.

Metabolism in the rat of the naturally occurring arsenic of shrimp as compared with arsenic trioxide. Address before the Biological Chemistry Section, American Chemical Society, New York, April 22, 1935. Published in Journal of Nutrition, September 1935, Springfield, Ill. Bureau of Fisheries' Special Memorandum 2525.

FIEDLER, R. H.

Nutritive value of fish. Address before Parent-Teacher's Association, Somerset, Maryland, February 5, 1935.

Activities of the Bureau of Fisheries. Address before the Washington Branch, American Business Club, Washington, D. C., February 13, 1935.

Marketing fish. Address before United Commercial Fishermen's Association of New Jersey. Atlantic City, N. J. February 23, 1935.

Some fundamental needs of the commercial fishery industry. Address before the National Planning Council of Fish and Game Commissioners, Chicago, Ill., April 10, 1935. Published as Bureau of Fisheries' Special Memorandum No. 2233-B., Washington, D. C.

Work of Bureau of Fisheries relative to commercial fisheries of Chesapeake Bay. Address before Tri-State Seafood Association, Ocean City, Md., August 17, 1935.

Work of Bureau of Fisheries relative to fishery trade in New York City. Address before Middle-Atlantic Fisheries Association, New York City, October 4, 1935.

FIEDLER, R. H., and V. J. SAMSON.

Survey of fish hatchery foods and feeding practices. Bureau of Fisheries' Special Memorandum No. 2526, Washington, D. C. Also published in Transactions of the American Fisheries Society, vol. 65, 1935. Washington, D. C.

GRIFFITHS, FRANCIS P.

Methods for making bacterial counts in fish. Address before Junior Class in Bacteriology, Massachusetts State College, Amherst, Mass., February 15, 1935.

Preservation of fishery products. Address to Junior-Senior Class in Food Preservation, Massachusetts State College, Amherst, Mass., March 19, 1935.

Significance of oxidation and reduction potentials in bacteriological studies. Address before Bacteriological Graduate Seminar, Massachusetts State College, Amherst, Mass., April 15, 1935.

HARRISON, ROGER W.

Some developments in markets for byproducts during the past year. Fishing Gazette, Annual Review Number, 1935, New York City, p. 92.

JARVIS, NORMAN D.

Home canning of fish. Bureau of Fisheries' Mem. S-338.

Utilization of salmon eggs. Bureau of Fisheries' Special Memorandum 1487-A.

JOHNSON, FRED F.

Per capita consumption of fish only 13.3 lbs. Bureau of Fisheries' Special Memorandum 2127-F.

LEMON, J. M.
The value of chemical research to the fisheries. Address delivered before the Northeastern University Chemists Club, Northeastern University, Boston, Mass., April 18, 1935.
MANNING, J. R.
To increase fish consumption. Fishing Gazette, Annual Review Number, 1935, New York City, p. 53.
RICH, WALTER H.
The horse mackerel (tuna) fishery of Maine. Bureau of Fisheries Mem. S-339.
STANSBY, MAURICE E.
Analysis of fish—Tests for the condition of the oil of fish flesh. Published in Journal of the Association of Official Agricultural Chemists, vol. 18, pp. 616–621, November 1935.
STANSBY, MAURICE E., and FRANCIS P. GRIFFITHS.
Carbon dioxide in handling fresh fish—haddock. Industrial and Engineering Chemistry, vol. 27, p. 1452, December 1935. Bureau of Fisheries Special Memorandum 1741.
WEBSTER, AGNES I.
Reaching the consumer. Fishing Gazette, Annual Review Number, 1935, New York City, p. 54.

### STATISTICAL BULLETINS

Fisheries of the New England States, 1933. Statistical Bulletin No. 1123.
Fisheries of the Middle Atlantic States, 1933. Statistical Bulletin No. 1116.
Fisheries of the Chesapeake Bay States, 1933. Statistical Bulletin No. 1114.
Fisheries of the Pacific Coast States, 1933. Statistical Bulletin No. 1127.
Fisheries of the United States and Alaska. Statistical Bulletin No. 1126.
Manufactured fishery products of the United States and Alaska. Statistical Bulletin No. 1128.
Fishery products frozen and cold-storage holdings of frozen and cured fishery products in the United States and Alaska, 1934. Statistical Bulletin No. 1117.
Production of fresh and frozen packaged fish in the United States, 1934. Statistical Bulletin No. 1138.
Canned fishery products and byproducts of the United States and Alaska, 1934. Statistical Bulletin No. 1133.
Fisheries of Alaska, 1934. Statistical Bulletin No. 1134.
Landings by fishing vessels at the three principal New England ports, 1934—by months. Statistical Bulletin No. 1120.
Landings by fishing vessels at the three principal New England ports, 1934—by gear and fishing grounds. Statistical Bulletin No. 1121.
Fishery products landed by United States fishing vessels at Seattle, Wash., 1934. Statistical Bulletin No. 1132.

## Part 2. FISHERY STATISTICS, 1934

### GENERAL REVIEW

Based upon available statistics for 1934, there was a large increase in the catch of fishery products in the United States and Alaska as compared with the preceding year. Statistics of the catch were collected for both 1933 and 1934 in the Chesapeake, Pacific, and Lake States and in Alaska, and when considering the combined catch of these sections alone, an increase of 50 percent in the volume and 33 percent in the value of the catch is indicated. While these increases are reflected in each of the four geographical sections and in many species, they are especially important in increased catches of pilchard, mackerel, and tuna and tunalike fishes in California. The value of the production of canned fishery products in all sections increased 34 percent as compared with 1933; byproducts increased 29 percent; and frozen fish about 50 percent. The value of the production of packaged fish also increased.

The total catch of fishery products in the United States and Alaska as based on the most recent surveys, amounted to 3,950,779,000 pounds, valued at $74,163,000. About 123,000 fishermen were employed in making this catch.

In 1934 in the United States and Alaska, the production of canned fishery products amounted to 700,157,272 pounds, valued at $80,-021,342; the output of byproducts was valued at $22,608,219; and the production of frozen fishery products, excluding packaged products, amounted to 97,290,184 pounds, estimated to be valued at $8,500,000. Based on the most recent surveys the production of cured fishery products amounted to 98,141,332 pounds, valued at $13,047,069, and fresh and frozen packaged fish and shellfish 150,-592,819 pounds, valued at $20,678,362. It is estimated that about 650,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about $52,000,000 were marketed during 1934. The total marketed value to domestic primary handlers of all fishery products in 1934 is estimated at nearly $200,000,000.

Fishery products imported for consumption were valued at $30,789,995 and domestic exports were valued at $13,821,781.

*New England States.*—No survey for the entire catch of fishery products in these States was made for 1934. In 1933 the volume of the catch showed an increase over the preceding year, but the value decreased. There were increases in both the volume and value of the combined landings of fishery products by vessels at Boston and Gloucester, Mass., and Portland, Maine, during 1934, and there were large increases in the production of Maine sardines, and frozen fish.

*Middle Atlantic States.*—No survey for the catch of fishery products in these States was made for 1934. In 1933 there was an increase in both volume and value of the catch as compared with the preceding year. There was an increase in the production of frozen fish during 1934 but a small decrease in the catch of shad in the Hudson River.

*Chesapeake Bay States.*—In 1934 the catch of fishery products in the Chesapeake Bay States increased as compared with the catch in 1933. The value of menhaden products which are produced in Virginia increased appreciably, however, the catch of shad in the Potomac River decreased sharply.

*South Atlantic and Gulf States.*—The catch of fishery products in the South Atlantic and Gulf States during 1934 showed a large increase in both volume and value over 1932 when the first preceding survey of the catch was made. There also were increases in the output of canned oysters and shrimp.

*Pacific Coast States.*—Statistics of the Pacific Coast States for 1934 show the largest volume of catch of fishery products of any year on record and the value was the largest since 1930. There were also increases in the packs of canned salmon, sardines, mackerel, tuna and tunalike fishes, and frozen fish.

*Lake States.*—In 1934 the catch of fish in the Lake States exceeded that of any year since 1918. The catch of lake herring and yellow perch was especially large.

*Mississippi River and tributaries.*—The most recent complete catch statistics of the fisheries of the Mississippi River and tributaries are those collected for the year 1931. As compared with 1922 when the most recent preceding survey was made, there was a decrease in

the catch which was reflected principally in a smaller catch of fresh-water mussels. A survey made for Lakes Pepin and Keokuk and the Mississippi River between these two lakes showed a decrease in 1934 as compared with the preceding year. The production of mussel-shell buttons decreased in 1934.

*Alaska.*—The catch of fishery products in Alaska in 1934 increased in both volume and value as compared with 1933. The pack of canned salmon was much larger in 1934 in both volume and value than in the preceding year. There also were increases in the production of fresh and frozen fish, and fishery byproducts; however, there was a decrease in both the volume and value of cured products.

*Fisheries of the United States and Alaska*

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Product | New England, 1933, Area XXII | | Middle Atlantic, 1933, Area XIII | | Chesapeake, 1934, Area XXIII | | South Atlantic and Gulf, 1934, Areas XXIV and XXV | | Pacific, 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Fish | 461,621 | 9,593 | 142,771 | 2,266 | 210,618 | 2,215 | 288,015 | 4,435 | 1,522,817 | 18,289 |
| Shellfish, etc | 38,315 | 3,893 | 26,982 | 2,545 | 78,393 | 3,728 | 159,899 | 5,559 | 19,287 | 1,569 |
| Whale products | | | | | | | | | 3,998 | 92 |
| Total | 499,936 | 13,486 | 169,753 | 4,811 | 289,011 | 5,943 | 447,914 | 9,994 | 1,546,102 | 19,950 |

| Product | Lakes, 1934 | | Mississippi River and tributaries, 1931 | | Alaska, 1934 | | Total for the various years | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Fish | 93,241 | 5,068 | 44,062 | 2,257 | 807,183 | 11,541 | 3,570,328 | 55,664 |
| Shellfish, etc | 3,170 | 56 | 38,321 | 640 | 2,732 | 166 | 367,099 | 18,156 |
| Whale products | | | | | 9,354 | 251 | 13,352 | 343 |
| Total | 96,411 | 5,124 | 82,383 | 2,897 | 819,269 | 11,958 | 3,950,779 | 74,163 |

NOTE.—The roman numerals appearing under the names of the sections are the numbers given these areas by the North American Council on Fishery Investigations. It should be explained that there are included under these areas craft whose principal fishing ports are in the respective areas but at times they may fish elsewhere.

OPERATING UNITS: BY SECTIONS

| Item | New England, 1933 | Middle Atlantic, 1933 | Chesapeake, 1934 | South Atlantic, and Gulf, 1934 [1] | Pacific, 1934 |
|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 5,049 | 2,442 | 2,132 | 2,914 | 6,914 |
| On boats and shore | 12,024 | 6,132 | 18,459 | 21,984 | 12,318 |
| Total | 17,073 | 8,574 | 20,591 | 24,898 | 19,232 |
| Vessels: | | | | | |
| Steam | 24 | 19 | 26 | | 3 |
| Net tonnage | 2,879 | 3,010 | 2,937 | | 64 |
| Motor | 570 | 384 | 115 | 710 | 946 |
| Net tonnage | 16,602 | 6,121 | 1,688 | 8,789 | 26,315 |
| Sail | 1 | 4 | 136 | 30 | 5 |
| Net tonnage | 47 | 32 | 1,513 | 298 | 2,170 |
| Total vessels | 595 | 407 | 277 | 740 | 954 |
| Total net tonnage | 19,528 | 9,163 | 6,138 | 9,087 | 28,549 |

[1] Includes the fisheries of Lake Okeechobee, Fla.

*Fisheries of the United States and Alaska*—Continued

OPERATING UNITS: By sections—Continued

| Item | New England, 1933 | Middle Atlantic, 1933 | Chesapeake, 1934 | South Atlantic, and Gulf, 1934 | Pacific, 1934 |
|---|---|---|---|---|---|
| Boats: | *Number* | *Number* | *Number* | *Number* | *Number* |
| Motor | 4,581 | 1,747 | 6,865 | 6,309 | 5,465 |
| Other | 3,819 | 2,123 | 5,852 | 8,089 | 908 |
| Accessory boats | 1,227 | 157 | 96 | 198 | 750 |
| Apparatus: | | | | | |
| Haul seines | 79 | 249 | 488 | 852 | 131 |
| Purse seines | 178 | 27 | 32 | 40 | 456 |
| Lampara nets | | | | | 213 |
| Otter trawls (including all types and sizes) | 566 | 197 | 25 | 3,051 | 26 |
| Beam trawls | | | | | 27 |
| Paranzella nets | | | | | 15 |
| Gill nets | 7,348 | 1,529 | 10,849 | 10,581 | 4,024 |
| Trammel nets | | | | 425 | 48 |
| Pound nets, trap nets, and weirs | 457 | 574 | 2,341 | 1,551 | 454 |
| Stop nets | | 96 | 2 | 9 | |
| Fyke nets | 121 | 2,667 | 2,640 | 490 | 2,075 |
| Bag nets and pocket nets | 144 | | | | |
| Other nets [3] | 423 | 433 | 3,712 | 14,486 | 454 |
| Hooks, baits, or snoods | 3,617,680 | 622,304 | 2,020,400 | 609,206 | 1,153,962 |
| Fish wheels | | | | 33 | 27 |
| Eel pots and traps | 4,774 | 7,324 | 13,583 | 790 | |
| Brush traps | | | | 25,250 | |
| Lobster pots | 319,460 | 46,576 | | | 6,520 |
| Crab, shrimp, crawfish pots, traps, drags, etc | 3,407 | 10 | | 2,654 | 21,784 |
| Clam dredges | 75 | 90 | | 1 | |
| Crab dredges | | 86 | 200 | | |
| Mussel dredges | 1 | 2 | | | |
| Oyster dredges | 107 | 353 | 690 | 662 | 4 |
| Scallop dredges and drags | 2,569 | 260 | | 6 | |
| Crab scrapes | | | 586 | | |
| Tongs, rakes, hoes, forks, picks, grabs, etc | 4,509 | 3,229 | 10,294 | 2,877 | 3,457 |
| Diving outfits | | | | 53 | 19 |
| Crowfoot bars | | | | | |
| Other apparatus [5] | 3,007 | 200 | 2 | 4,473 | 53 |

| Item | Lakes, 1934 | Mississippi River and tributaries, 1931 | Alaska, 1934 | Total for the various years |
|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* |
| On vessels | 1,703 | | [2] 9,433 | 30,587 |
| On boats and shore | 5,876 | 15,884 | | 92,677 |
| Total | 7,579 | 15,884 | 9,433 | 123,264 |
| Vessels: | | | | |
| Steam | 76 | | 7 | 155 |
| Net tonnage | 1,716 | | 541 | 11,147 |
| Motor | 414 | | 629 | 3,768 |
| Net tonnage | 4,581 | | 8,814 | 72,910 |
| Sail | | | | 176 |
| Net tonnage | | | | 4,060 |
| Total vessels | 490 | | 636 | 4,099 |
| Total net tonnage | 6,297 | | 9,355 | 88,117 |
| Boats: | | | | |
| Motor | 1,720 | 4,426 | 1,022 | 32,135 |
| Other | 1,350 | 10,120 | 3,253 | 35,514 |
| Accessory boats | 18 | | | 2,446 |
| Apparatus: | | | | |
| Haul seines | 254 | 1,013 | 140 | 3,206 |
| Purse seines | | | 553 | 1,286 |
| Lampara nets | | | | 213 |
| Otter trawls (including all types and sizes) | | | | 3,865 |
| Beam trawls | | | 13 | 40 |
| Paranzella nets | | | | 15 |
| Gill nets | 98,012 | 101 | 3,709 | 136,153 |

[2] Includes persons in boat and shore fisheries.
[3] Includes dip nets, push nets, reef nets, cast nets, scap nets, and drag nets.
[5] Includes periwinkle, cockle, and fish pots; harpoons; spears; baskets; coquina scoops; and sponge hooks.

*Fisheries of the United States and Alaska*—Continued

OPERATING UNITS: BY SECTIONS—Continued

| Item | Lakes, 1934 | Mississippi River and tributaries, 1931 | Alaska, 1934 | Total for the various years |
|---|---|---|---|---|
| Apparatus—Continued. | *Number* | *Number* | *Number* | *Number* |
| Trammel nets | 123 | 518 | | 1,114 |
| Pound nets, trap nets, and weirs | 9,008 | 374 | 479 | 15,238 |
| Stop nets | | | | 107 |
| Fyke nets | 2,821 | 32,541 | | 43,355 |
| Bag nets and pocket nets | | | | 144 |
| Other nets [3] | | 191 | | 19,699 |
| Hooks, baits, or snoods | 726,986 | 2,459,179 | (4) | 11,209,717 |
| Fish wheels | | | 262 | 322 |
| Eel pots and traps | | | | 26,471 |
| Brush traps | | | | 25,250 |
| Lobster pots | | | | 372,556 |
| Crab, shrimp, crawfish pots, traps, drags, etc | 2,710 | 456 | 2,851 | 33,872 |
| Clam dredges | | | | 166 |
| Crab dredges | | | | 286 |
| Mussel dredges | | 440 | | 443 |
| Oyster dredges | | | | 1,816 |
| Scallop dredges and drags | | | | 2,835 |
| Crab scrapes | | | | 586 |
| Tongs, rakes, hoes, forks, picks, grabs, etc | 142 | 3,994 | | 28,502 |
| Diving outfits | 16 | | | 88 |
| Crowfoot bars | 685 | 4,480 | | 5,165 |
| Other apparatus [5] | | 3,781 | | 11,516 |

CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | New England, 1933 | | Middle Atlantic, 1933 | | Chesapeake, 1934 | | South Atlantic and Gulf, 1934 [1] | | Pacific, 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|
| FISH | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Alewives | 2,817 | 17 | 1,390 | 10 | 11,080 | 96 | 15,112 | 92 | | |
| Amberjack | 2 | (6) | | | | | 4 | (6) | | |
| Anchovies | | | | | | | | | 258 | 4 |
| Barracuda | | | | | | | | | 2,183 | 95 |
| Black bass | | | | | 33 | 3 | 424 | 25 | | |
| Bluefish | 921 | 76 | 3,252 | 132 | 1,265 | 55 | 3,732 | 165 | | |
| Blue runner or hardtail | | | | | | | 184 | 3 | | |
| Bonito | 52 | 2 | 247 | 14 | 20 | 1 | | | | |
| Bowfin | | | | | | | 1 | (6) | | |
| Buffalofish | | | | | | | 19 | 1 | | |
| Butterfish | 1,554 | 68 | 4,410 | 181 | 3,791 | 121 | 44 | 1 | | |
| Cabio or crab eater | | | | | 25 | 1 | 7 | (6) | | |
| Cabrilla | | | | | | | | | 332 | 14 |
| Carp | | | 390 | 36 | 460 | 24 | 109 | 4 | 264 | 5 |
| Catfish and bullheads | | | 76 | 6 | 776 | 32 | 3,480 | 117 | 185 | 23 |
| Cero | | | 3 | (6) | | | 4 | (6) | | |
| Cigarfish | | | | | | | 4 | (6) | | |
| Cod | 99,632 | 1,856 | 7,493 | 212 | 2 | (6) | | | 16,440 | 221 |
| Corbina | | | | | | | | | 1 | (6) |
| Crappie | | | | | 1 | (6) | 462 | 12 | | |
| Crevalle | 2 | (6) | 7 | (6) | | | 115 | 2 | | |
| Croaker | 2,497 | 36 | 2,048 | 48 | 22,074 | 266 | 8,374 | 118 | | |
| Cunner | 42 | (6) | | | | | | | | |
| Cusk | 6,109 | 72 | 4 | (6) | | | | | | |
| Cutlassfish | | | | | 2 | (6) | | | | |
| Dolphin | | | (6) | (6) | (6) | (6) | 8 | (6) | | |
| Drum: | | | | | | | | | | |
| Black | (6) | (6) | (6) | (6) | 38 | 1 | 2,556 | 69 | | |
| Red or redfish | 2 | (6) | 9 | (6) | 60 | 1 | 3,365 | 156 | | |
| Eels: | | | | | | | | | | |
| Common | 517 | 35 | 680 | 60 | 274 | 24 | 63 | 3 | | |
| Conger | 41 | 1 | 16 | 1 | 2 | (6) | | | | |
| Flounders | 37,795 | 1,173 | 9,252 | 363 | 1,000 | 49 | 1,297 | 63 | 12,471 | 624 |
| Flyingfish | | | | | | | | | 26 | 1 |
| Frigate mackerel | 125 | 4 | 102 | 2 | | | | | | |

[1] Includes the fisheries of Lake Okeechobee, Fla.
[3] Includes dip nets, push nets, reef nets, scap nets, and drag nets.
[4] Number not determined.
[5] Includes periwinkle, cockle, and fish pots; harpoons; spears; baskets; coquina scoops; and sponge hooks.
[6] Less than 500 pounds or dollars.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | New England, 1933 | | Middle Atlantic, 1933 | | Chesapeake, 1934 | | South Atlantic and Gulf, 1934 | | Pacific, 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|
| FISH—continued | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Garfish | | | | | | | (6) | (6) | | |
| Gizzard shad | | | | | 114 | 1 | 24 | (6) | | |
| Goosefish | | | 10 | (6) | | | | | | |
| Grayfish | 13 | (6) | 7 | (6) | | | | | 526 | 12 |
| Groupers | | | | | | | 3,570 | 85 | 61 | 3 |
| Grunts | | | | | | | 49 | 1 | | |
| Haddock | 160,107 | 3,646 | 8,507 | 248 | (6) | (6) | | | | |
| Hake | 15,320 | 203 | 162 | 3 | 21 | (6) | | | 57 | 1 |
| Halibut | 2,457 | 236 | 53 | 7 | | | | | 24,800 | 1,780 |
| Hardhead | | | | | | | | | 147 | 7 |
| Harvestfish or "starfish" | | | | | 289 | 12 | 820 | 12 | | |
| Herring: | | | | | | | | | | |
| Round | | | 1 | (6) | | | | | | |
| Sea | 48,087 | 211 | 666 | 6 | 361 | 3 | | | 1,081 | 6 |
| Herring smelt | 12 | (6) | | | | | | | | |
| Hickory shad | 2 | (6) | 1 | (6) | 108 | 2 | 158 | 7 | | |
| Hogfish | | | | | | | 6 | (6) | | |
| Horse mackerel | | | | | | | | | 1,581 | 15 |
| Jewfish | | | | | | | 47 | 1 | | |
| Kingfish (California) | | | | | | | | | 634 | 15 |
| Kingfish or "king mackerel" | | | (6) | (6) | | | 2,661 | 117 | | |
| King whiting or "kingfish" | 40 | 1 | 157 | 15 | 106 | 5 | 661 | 16 | | |
| Lake trout | | | | | | | | | | |
| Launce | 21 | (6) | | | | | | | | |
| "Lingcod" | | | | | | | | | 2,092 | 67 |
| Mackerel | 40,832 | 878 | 662 | 22 | 15 | 1 | (6) | (6) | 113,848 | 720 |
| Marlin | | | | | | | | | 65 | 3 |
| Menhaden | 1,029 | 3 | 79,575 | 236 | 143,879 | 600 | 164,386 | 541 | | |
| Minnows | | | | | 57 | 3 | | | | |
| Mojarro | | | | | | | 19 | (6) | | |
| Mooneye | | | | | | | | | | |
| Mullet | 9 | (6) | 318 | 9 | 114 | 4 | 30,485 | 812 | 19 | 1 |
| Mummichog | | | 51 | 4 | | | | | | |
| Muttonfish | | | | | | | 199 | 9 | | |
| Paddlefish or "spoonbill cat" | | | | | | | 1 | (6) | | |
| Permit | | | | | | | 2 | (6) | | |
| Pigfish | 4 | (6) | (6) | (6) | 9 | (6) | 187 | 3 | | |
| Pike or pickerel (jacks) | | | (6) | (6) | 23 | 3 | 1 | (6) | | |
| Pilchard | | | | | | | | | 1,135,959 | 4,178 |
| Pinfish | | | | | | | 211 | 2 | | |
| Pollock | 15,027 | 164 | 777 | 12 | | | | | | |
| Pompano | | | (6) | (6) | | | 442 | 79 | 4 | 2 |
| Quillback | | | | | | | | | | |
| Rock bass | | | | | | | | | 412 | 21 |
| Rockfishes | | | | | | | | | 5,228 | 184 |
| Rosefish | 264 | 3 | | | | | | | | |
| Rudderfish | | | | | | | | | 32 | 1 |
| Sablefish | | | | | | | | | 4,450 | 145 |
| Salmon: | | | | | | | | | | |
| Atlantic | 25 | 6 | | | | | | | | |
| Blueback, red or sockeye | | | | | | | | | 24,297 | 1,564 |
| Chinook or king | | | | | | | | | 33,432 | 2,346 |
| Chum or keta | | | | | | | | | 10,696 | 222 |
| Humpback or pink | | | | | | | | | 191 | 6 |
| Silver or coho | | | | | | | | | 18,476 | 814 |
| Sauger | | | | | | | | | | |
| Sawfish | | | | | | | 18 | (6) | | |
| Sculpin | | | | | | | | | 71 | 4 |
| Scup or porgies | 4,195 | 89 | 6,360 | 92 | 731 | 20 | 38 | 1 | | |
| Sea bass | 3,999 | 122 | 2,475 | 87 | 137 | 5 | 256 | 10 | 859 | 38 |
| Sea bass, white (California) | | | | | | | | | 852 | 56 |
| Sea catfish | | | | | | | 105 | (6) | | |
| Sea robin | 77 | 1 | 30 | (6) | 1 | (6) | | | | |
| Shad | 386 | 16 | 834 | 76 | 4,990 | 405 | 2,497 | 330 | 1,949 | 57 |
| Sharks | 66 | 1 | 12 | (6) | 20 | (6) | 3,230 | 9 | | |

6 Less than 500 pounds or dollars.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | New England, 1933 | | Middle Atlantic, 1933 | | Chesapeake, 1934 | | South Atlantic and Gulf, 1934 | | Pacific, 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|
| FISH—continued | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value |
| Sheepshead: | | | | | | | | | | |
| Fresh water | | | | | | | | | | |
| Salt water | (6) | (6) | (6) | (6) | | | 1,199 | 39 | 144 | |
| Silver perch | | | | | 6 | (6) | | | | |
| Silversides | | | 23 | 3 | | | | | | |
| Skates | 240 | 2 | 84 | 1 | 10 | (6) | 175 | (6) | 232 | 3 |
| Skipper or "billfish" | 5 | (6) | | | | | | | | |
| Smelt | 551 | 60 | (6) | (6) | | | | | 3,867 | 84 |
| Snapper: | | | | | | | | | | |
| Mangrove | | | | | | | 229 | 7 | | |
| Red | | | | | | | 5,856 | 323 | | |
| Snook | | | | | | | 428 | 11 | | |
| Spadefish | | | | | | | 6 | (6) | | |
| Spanish mackerel | | | 6 | (6) | 53 | 4 | 6,968 | 286 | 7 | (6) |
| Splittail | | | | | | | | | 55 | 1 |
| Spot | 33 | (6) | 528 | 8 | 2,104 | 61 | 4,905 | 76 | | |
| Squawfish | | | | | | | | | 2 | (6) |
| Squeteague or "sea trout": | | | | | | | | | | |
| Gray | 369 | 14 | 7,874 | 227 | 14,884 | 296 | 7,742 | 181 | | |
| Spotted | 2 | (6) | (6) | (6) | 57 | 3 | 8,711 | 544 | | |
| White | | | | | | | 731 | 18 | | |
| Squirrel hake | | | 53 | (6) | | | | | | |
| Steelhead trout | | | | | | | | | 2,830 | 164 |
| Striped bass | 61 | 7 | 40 | 6 | 642 | 66 | 362 | 36 | 825 | 49 |
| Sturgeon | 8 | 1 | 30 | 3 | 8 | 1 | 73 | 6 | 80 | 2 |
| Sturgeon, shovelnose | | | | | | | | | | |
| Suckers | 52 | 2 | 172 | 13 | 22 | 1 | | | 63 | 1 |
| Sunfish | | | 2 | (6) | 25 | 1 | 517 | 14 | | |
| Surffishes (perch) | | | | | | | | | 263 | 14 |
| Swellfish | | | 2 | (6) | 2 | (6) | | | | |
| Swordfish | 3,381 | 405 | 103 | 13 | | | | | 264 | 37 |
| Tautog | 484 | 16 | 132 | 12 | 1 | (6) | | | | |
| Tenpounder | | | | | | | 29 | (6) | | |
| Thimble-eyed mackerel | 78 | 2 | 25 | (6) | 22 | (6) | | | | |
| Tilefish | 207 | 10 | 1,350 | 68 | | | | | | |
| Tomcod | 2 | (6) | 8 | (6) | | | | | 1 | (6) |
| Tripletail | | | | | | | 1 | (6) | | |
| Tullibees | | | | | | | | | | |
| Tuna and tunalike fishes: | | | | | | | | | | |
| Albacore | | | | | | | | | 121 | 9 |
| Bluefin or horse mackerel | 401 | 18 | 43 | 2 | | | 4 | (6) | 18,358 | 846 |
| Bonito | | | | | | | | | 3,203 | 77 |
| Skipjack or striped | | | | | | | | | 14,830 | 594 |
| Yellowfin | | | | | | | | | 60,913 | 3,053 |
| Turbot | | | | | | | 2 | (6) | | |
| Wahoo | | | | | | | 2 | (6) | | |
| White bass | | | | | | | | | | |
| Whitebait | | | 3 | (6) | | | | | 106 | 5 |
| Whitefish: | | | | | | | | | | |
| Common | | | | | | | | | 93 | 5 |
| Menominee | | | | | | | | | | |
| White perch | 50 | 7 | 75 | 5 | 734 | 34 | 540 | 23 | | |
| Whiting | 9,419 | 97 | 2,147 | 21 | 4 | (6) | | | | |
| Wolffish | 2,197 | 32 | 26 | 1 | | | | | | |
| Yellow perch | 1 | (6) | 8 | 1 | 166 | 10 | 17 | (6) | | |
| Yellow pike | | | | | | | | | | |
| Yellowtail | | | | | | | 81 | 5 | 2,347 | 79 |
| Miscellaneous fish | | | | | | | | | 234 | 6 |
| Total | 461,621 | 9,593 | 142,771 | 2,266 | 210,618 | 2,215 | 288,015 | 4,435 | 1,522,817 | 18,289 |
| SHELLFISH, ETC. | | | | | | | | | | |
| Crabs: | | | | | | | | | | |
| Hard | 5,629 | 40 | 955 | 25 | 36,137 | 739 | 18,013 | 266 | 7,004 | 462 |
| King | 7 | (6) | 2,750 | 7 | | | 500 | (6) | | |
| Soft | | | 94 | 20 | 3,660 | 311 | 908 | 123 | | |
| Stone | | | | | | | 81 | 6 | | |
| Crawfish | | | | | | | | | 144 | 15 |

[6] Less than 500 pounds or dollars.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | New England, 1933 | | Middle Atlantic, 1933 | | Chesapeake, 1934 | | South Atlantic and Gulf, 1934 | | Pacific, 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|
| SHELLFISH—continued | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Lobsters: | | | | | | | | | | |
| Common | 9,088 | 1,608 | 724 | 137 | (6) | (6) | | | | |
| Spiny | | | | | | | 351 | 17 | 1,183 | 180 |
| Shrimp | 41 | 2 | 86 | 15 | | | 119,318 | 3,069 | 1,844 | 32 |
| Abalone | | | | | | | | | 645 | 105 |
| Clams: | | | | | | | | | | |
| Coquina | | | | | | | 6 | 1 | | |
| Hard | 3,040 | 375 | 3,621 | 532 | 2,641 | 367 | 920 | 66 | 712 | 42 |
| Pismo | | | | | | | | | 35 | 7 |
| Razor | 358 | 16 | | | | | | | 586 | 84 |
| Soft | 9,431 | 476 | 1,136 | 65 | | | | | 71 | 16 |
| Surf | 59 | 4 | 526 | 24 | | | | | | |
| Mixed | | | | | | | | | 38 | 2 |
| Conchs | | | 35 | 2 | | | 2 | (6) | | |
| Mussels, sea | 141 | 6 | 53 | 3 | 23 | 1 | | | | |
| Mussel shells | | | | | | | | | | |
| Octopus | | | | | | | 2 | (6) | 96 | 4 |
| Oysters: | | | | | | | | | | |
| Eastern, market, public | 87 | 12 | 178 | 20 | 22,588 | 1,347 | 12,170 | 731 | | |
| Eastern, market, private | 5,070 | 735 | 13,754 | 1,428 | 13,198 | 956 | 6,657 | 410 | 90 | 39 |
| Japanese, market | | | | | | | | | 4,956 | 359 |
| Western, market | | | | | | | | | 330 | 187 |
| Periwinkles and "cockles" | 191 | 12 | | | | | | | | |
| Scallops: | | | | | | | | | | |
| Bay | 621 | 204 | 49 | 17 | | | 110 | 12 | 12 | 3 |
| Sea | 2,158 | 267 | 2,197 | 216 | 1 | 1 | 120 | 18 | | |
| Squid | 1,075 | 19 | 792 | 15 | 114 | 4 | | | 1,537 | 32 |
| Sea urchins | 6 | (6) | | | | | | | | |
| Terrapin | | | 1 | 1 | 26 | 2 | 17 | 2 | | |
| Turtles | | | 11 | 1 | 5 | (6) | 69 | 1 | 4 | (6) |
| Frogs | | | | | | | | | | |
| Irish moss | 12 | 1 | | | | | | | | |
| Sponges | | | | | | | 655 | 837 | | |
| Pearls and slugs | | | | | | | | | | |
| Bloodworms | 661 | 71 | 11 | 10 | | | | | | |
| Sandworms | 640 | 45 | 9 | 7 | | | | | | |
| Total | 38,315 | 3,893 | 26,982 | 2,545 | 78,393 | 3,728 | 159,899 | 5,559 | 19,287 | 1,569 |
| WHALE PRODUCTS [7] | | | | | | | | | | |
| Meat | | | | | | | | | 2,044 | 41 |
| Fertilizer | | | | | | | | | | |
| Oil, sperm | | | | | | | | | | |
| Oil, whale | | | | | | | | | 1,954 | 51 |
| Total | | | | | | | | | 3,998 | 92 |
| Grand total | 499,936 | 13,486 | 169,753 | 4,811 | 289,011 | 5,943 | 447,914 | 9,994 | 1,546,102 | 19,950 |

| Species | Lakes, 1934 | | Mississippi River and tributaries, 1931 | | Alaska, 1934 | | Total for the various years | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Alewives | | | | | | | 30,399 | 215 |
| Amberjack | | | | | | | 6 | (6) |
| Anchovies | | | | | | | 258 | 4 |
| Barracuda | | | | | | | 2,183 | 95 |
| Black bass | | | 14 | 2 | | | 471 | 30 |
| Bluefish | | | | | | | 9,170 | 428 |
| Blue pike | 8,509 | 445 | | | | | 8,509 | 445 |
| Blue runner or hardtail | | | | | | | 184 | 3 |
| Bonito | | | | | | | 319 | 17 |
| Bowfin | 9 | (6) | 428 | 9 | | | 438 | 9 |
| Buffalofish | 1 | (6) | 15,772 | 688 | | | 15,792 | 689 |

[6] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | Lakes, 1934 | | Mississippi River and tributaries, 1931 | | Alaska, 1934 | | Total for the various years | |
|---|---|---|---|---|---|---|---|---|
| FISH—continued | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Butterfish | | | | | | | 9,799 | 371 |
| Burbot | 396 | 7 | | | | | 396 | 7 |
| Cabio or crab eater | | | | | | | 32 | 1 |
| Cabrilla | | | | | | | 332 | 14 |
| Carp | 3,846 | 66 | 11,892 | 456 | | | 16,961 | 591 |
| Catfish and bullheads | 789 | 48 | 10,267 | 878 | | | 15,573 | 1,104 |
| Cero | | | | | | | 7 | (6) |
| Chubs | 7,149 | 644 | | | | | 7,149 | 644 |
| Cigarfish | | | | | | | 4 | (6) |
| Cisco | 111 | 9 | | | | | 111 | 9 |
| Cod | | | | | 1,487 | 9 | 125,054 | 2,298 |
| Corbina | | | | | | | 1 | (6) |
| Crappie | 1 | (6) | 41 | 3 | | | 505 | 15 |
| Crevalle | | | | | | | 124 | 2 |
| Croaker | | | | | | | 34,993 | 468 |
| Cunner | | | | | | | 42 | (6) |
| Cusk | | | | | | | 6,113 | 72 |
| Cutlassfish | | | | | | | 2 | (6) |
| Dolly Varden trout | | | | | 41 | 3 | 41 | 3 |
| Dolphin | | | | | | | 8 | (6) |
| Drum: | | | | | | | | |
| Black | | | | | | | 2,594 | 70 |
| Red or redfish | | | | | | | 3,436 | 157 |
| Eels: | | | | | | | | |
| Common | 65 | 2 | 7 | (6) | | | 1,606 | 124 |
| Conger | | | | | | | 59 | 2 |
| Flounders | | | | | 300 | 4 | 62,115 | 2,276 |
| Flyingfish | | | | | | | 26 | 1 |
| Frigate mackerel | | | | | | | 227 | 6 |
| Garfish | | | 73 | 1 | | | 73 | 1 |
| Gizzard shad | | | | | | | 138 | 1 |
| Goldfish | 68 | 1 | | | | | 68 | 1 |
| Goosefish | | | | | | | 10 | (6) |
| Grayfish | | | | | | | 546 | 12 |
| Groupers | | | | | | | 3,631 | 88 |
| Grunts | | | | | | | 49 | 1 |
| Haddock | | | | | | | 168,614 | 3,894 |
| Hake | | | | | | | 15,560 | 207 |
| Halibut | | | | | 14,690 | 805 | 42,000 | 2,828 |
| Hardhead | | | | | | | 147 | 7 |
| Harvestfish or "starfish" | | | | | | | 1,109 | 24 |
| Herring: | | | | | | | | |
| Round | | | | | | | 1 | (6) |
| Lake | 23,941 | 440 | | | | | 23,941 | 440 |
| Sea | | | | | 165,637 | 828 | 215,832 | 1,054 |
| Herring smelt | | | | | | | 12 | (6) |
| Hickory shad | | | | | | | 269 | 9 |
| Hogfish | | | | | | | 6 | (6) |
| Horse mackerel | | | | | | | 1,581 | 15 |
| Jewfish | | | | | | | 47 | 1 |
| Kingfish (California) | | | | | | | 634 | 15 |
| Kingfish or "king mackerel" | | | | | | | 2,661 | 117 |
| King whiting or "kingfish" | | | | | | | 964 | 37 |
| Lake trout | 10,112 | 1,200 | | | | | 10,112 | 1,200 |
| Launce | | | | | | | 21 | (6) |
| "Lingcod" | | | | | | | 2,092 | 67 |
| Mackerel | | | | | | | 155,357 | 1,621 |
| Marlin | | | | | | | 65 | 3 |
| Menhaden | | | | | | | 388,869 | 1,380 |
| Minnows | | | 1 | (6) | | | 58 | 3 |
| Mojarro | | | | | | | 19 | (6) |
| Mooneye | 26 | (6) | 3 | (6) | | | 29 | (6) |
| Mullet | | | | | | | 30,945 | 826 |
| Mummichog | | | | | | | 51 | 4 |
| Muttonfish | | | | | | | 199 | 9 |
| Paddlefish or "spoonbill cat" | | | 951 | 43 | | | 952 | 43 |
| Permit | | | | | | | 2 | (6) |
| Pigfish | | | | | | | 200 | 3 |
| Pike or pickerel (jacks) | 559 | 19 | 5 | (6) | | | 588 | 22 |
| Pilchard | | | | | | | 1,135,959 | 4,178 |
| Pinfish | | | | | | | 211 | 2 |
| Pollock | | | | | | | 15,804 | 176 |
| Pompano | | | | | | | 446 | 81 |
| Quillback | | | 268 | 11 | | | 268 | 11 |

[6] Less than 500 pounds or dollars.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | Lakes, 1934 | | Mississippi River and tributaries, 1931 | | Alaska, 1934 | | Total for the various years | |
|---|---|---|---|---|---|---|---|---|
| FISH—continued | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Rock bass | 23 | 1 | | | | | 435 | 22 |
| Rockfishes | | | | | 7 | (6) | 5,235 | 184 |
| Rosefish | | | | | | | 264 | 3 |
| Rudderfish | | | | | | | 32 | 1 |
| Sablefish | | | | | 317 | 9 | 4,767 | 154 |
| Salmon: | | | | | | | | |
| Atlantic | | | | | | | 25 | 6 |
| Blueback, red or sockeye | | | | | 225,457 | 4,510 | 249,754 | 6,074 |
| Chinook or king | | | | | 11,193 | 270 | 44,625 | 2,616 |
| Chum or keta | | | | | 73,136 | 706 | 83,832 | 928 |
| Humpback or pink | | | | | 292,153 | 4,002 | 292,344 | 4,008 |
| Silver or coho | | | | | 22,712 | 393 | 41,188 | 1,207 |
| Sauger | 1,174 | 58 | 3 | (6) | | | 1,177 | 58 |
| Sawfish | | | | | | | 18 | (6) |
| Sculpin | | | | | | | 71 | 4 |
| Scup or porgies | | | | | | | 11,324 | 202 |
| Sea bass | | | | | | | 7,726 | 262 |
| Sea bass, white (California) | | | | | | | 852 | 56 |
| Sea catfish | | | | | | | 105 | (6) |
| Sea robin | | | | | | | 108 | 1 |
| Shad | | | | | | | 10,656 | 884 |
| Sharks | | | | | | | 3,328 | 10 |
| Sheepshead: | | | | | | | | |
| Fresh water | 2,232 | 38 | 3,905 | 143 | | | 6,137 | 181 |
| Salt water | | | | | | | 1,343 | 44 |
| Silver perch | | | | | | | 6 | (6) |
| Silversides | | | | | | | 23 | 3 |
| Skates | | | | | | | 741 | 6 |
| Skipper or "billfish" | | | | | | | 5 | (6) |
| Smelt | 1,029 | 16 | | | | | 5,447 | 160 |
| Snapper: | | | | | | | | |
| Mangrove | | | | | | | 229 | 7 |
| Red | | | | | | | 5,856 | 323 |
| Snook | | | | | | | 428 | 11 |
| Spadefish | | | | | | | 6 | (6) |
| Spanish mackerel | | | | | | | 7,034 | 290 |
| Splittail | | | | | | | 55 | 1 |
| Spot | | | | | | | 7,570 | 145 |
| Squawfish | | | | | | | 2 | (6) |
| Squeteague or "sea trout": | | | | | | | | |
| Gray | | | | | | | 30,869 | 718 |
| Spotted | | | | | | | 8,770 | 547 |
| White | | | | | | | 731 | 18 |
| Squirrel hake | | | | | | | 53 | (6) |
| Steelhead trout | 2 | (6) | | | 53 | 2 | 2,885 | 166 |
| Striped bass | | | | | | | 1,930 | 164 |
| Sturgeon | 36 | 9 | | | | | 235 | 22 |
| Sturgeon, shovelnose | | | 87 | 8 | | | 87 | 8 |
| Suckers | 5,616 | 136 | 315 | 13 | | | 6,240 | 166 |
| Sunfish | 18 | (6) | 22 | 1 | | | 584 | 16 |
| Surffishes (perch) | | | | | | | 263 | 14 |
| Swellfish | | | | | | | 4 | (6) |
| Swordfish | | | | | | | 3,748 | 455 |
| Tautog | | | | | | | 617 | 28 |
| Tenpounder | | | | | | | 29 | (6) |
| Thimble-eyed mackerel | | | | | | | 125 | 2 |
| Tilefish | | | | | | | 1,557 | 78 |
| Tomcod | | | | | | | 11 | (6) |
| Tripletail | | | | | | | 1 | (6) |
| Tullibees | 156 | (6) | | | | | 156 | (6) |
| Tuna and tunalike fishes: | | | | | | | | |
| Albacore | | | | | | | 121 | 9 |
| Bluefin or horse mackerel | | | | | | | 18,806 | 866 |
| Bonito | | | | | | | 3,203 | 77 |
| Skipjack or striped | | | | | | | 14,830 | 594 |
| Yellowfin | | | | | | | 60,913 | 3,053 |
| Turbot | | | | | | | 2 | (6) |
| Wahoo | | | | | | | 2 | (6) |
| White bass | 688 | 25 | 3 | (6) | | | 691 | 25 |
| Whitebait | | | | | | | 109 | 5 |
| Whitefish: | | | | | | | | |
| Common | 6,276 | 804 | | | | | 6,369 | 809 |
| Menominee | 229 | 12 | | | | | 229 | 12 |

[6] Less than 500 pounds or dollars.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | Lakes, 1934 | | Mississippi River and tributaries, 1931 | | Alaska, 1934 | | Total for the various years | |
|---|---|---|---|---|---|---|---|---|
| FISH—continued | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| White perch | | | | | | | 1,399 | 69 |
| Whiting | | | | | | | 11,570 | 118 |
| Wolffish | | | | | | | 2,223 | 33 |
| Yellow perch | 16,099 | 695 | | | | | 16,291 | 706 |
| Yellow pike | 4,081 | 393 | 5 | 1 | | | 4,086 | 394 |
| Yellowtail | | | | | | | 2,428 | 84 |
| Miscellaneous fish | | | | | | | 234 | 6 |
| Total | 93,241 | 5,068 | 44,062 | 2,257 | 807,183 | 11,541 | 3,570,328 | 55,664 |
| SHELLFISH, ETC. | | | | | | | | |
| Crabs: | | | | | | | | |
| Hard | | | | | 1,259 | 104 | 68,997 | 1,636 |
| King | | | | | | | 3,257 | 7 |
| Soft | | | | | | | 4,662 | 454 |
| Stone | | | | | | | 81 | 6 |
| Crawfish | 36 | 3 | 28 | (6) | | | 208 | 18 |
| Lobsters: | | | | | | | | |
| Common | | | | | | | 9,812 | 1,745 |
| Spiny | | | | | | | 1,534 | 197 |
| Shrimp | | | 49 | 4 | 690 | 24 | 122,028 | 3,146 |
| Abalone | | | | | | | 645 | 105 |
| Clams: | | | | | | | | |
| Coquina | | | | | | | 6 | 1 |
| Hard | | | | | 2 | (6) | 10,936 | 1,382 |
| Pismo | | | | | | | 35 | 7 |
| Razor | | | | | 781 | 38 | 1,725 | 138 |
| Soft | | | | | | | 10,638 | 557 |
| Surf | | | | | | | 585 | 28 |
| Mixed | | | | | | | 38 | 2 |
| Conchs | | | | | | | 37 | 2 |
| Mussels, sea | | | | | | | 217 | 10 |
| Mussel shells | 3,134 | 51 | 37,255 | 422 | | | 40,389 | 473 |
| Octopus | | | | | | | 98 | 4 |
| Oysters: | | | | | | | | |
| Eastern, market, public | | | | | | | 35,023 | 2,110 |
| Eastern, market, private | | | | | | | 38,769 | 3,568 |
| Japanese, market | | | | | | | 4,956 | 359 |
| Western, market | | | | | | | 330 | 187 |
| Periwinkles and "cockles" | | | | | | | 191 | 12 |
| Scallops: | | | | | | | | |
| Bay | | | | | | | 792 | 236 |
| Sea | | | | | | | 4,476 | 592 |
| Squid | | | | | | | 3,518 | 70 |
| Sea urchins | | | | | | | 6 | (6) |
| Terrapin | | | 19 | (6) | | | 63 | 5 |
| Turtles | | | 95 | 3 | | | 184 | 5 |
| Frogs | | | 875 | 131 | | | 875 | 131 |
| Irish moss | | | | | | | 12 | 1 |
| Sponges | | | | | | | 655 | 837 |
| Pearls and slugs | | 2 | | 80 | | | | 82 |
| Bloodworms | | | | | | | 672 | 81 |
| Sandworms | | | | | | | 649 | 52 |
| Total | 3,170 | 56 | 38,321 | 640 | 2,732 | 166 | 367,099 | 18,156 |
| WHALE PRODUCTS [7] | | | | | | | | |
| Meat | | | | | | | 2,044 | 41 |
| Fertilizer | | | | | 2,698 | 38 | 2,698 | 38 |
| Oil, sperm | | | | | 574 | 17 | 574 | 17 |
| Oil, whale | | | | | 6,082 | 196 | 8,036 | 247 |
| Total | | | | | 9,354 | 251 | 13,352 | 343 |
| Grand total | 96,411 | 5,124 | 82,383 | 2,897 | 819,269 | 11,958 | 3,950,779 | 74,163 |

[6] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

*Fisheries of the United States and Alaska*—Continued

CATCH: BY STATES [8]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| State | Marine and coastal rivers | | Mississippi River and tributaries | | Lakes [9] | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Alabama | 7,964 | 253 | 1,822 | 33 | | | 9,786 | 286 |
| Arkansas | | | 15,733 | 411 | | | 15,733 | 411 |
| California | 1,406,176 | 12,188 | | | | | 1,406,176 | 12,188 |
| Connecticut | 9,878 | 613 | | | | | 9,878 | 613 |
| Delaware | 36,527 | 209 | | | | | 36,527 | 209 |
| Florida | 117,192 | 3,587 | | | 1,609 | 48 | 118,801 | 3,635 |
| Georgia | 27,141 | 360 | | | | | 27,141 | 360 |
| Illinois | | | 14,263 | 367 | 1,206 | 92 | 15,469 | 459 |
| Indiana | | | 7,717 | 157 | 702 | 52 | 8,419 | 209 |
| Iowa | | | 7,778 | 302 | | | 7,778 | 302 |
| Kansas | | | 455 | 17 | | | 455 | 17 |
| Kentucky | | | 1,622 | 61 | | | 1,622 | 61 |
| Louisiana | 76,633 | 2,285 | 19,214 | 995 | | | 95,847 | 3,280 |
| Maine | 98,498 | 2,307 | | | | | 98,498 | 2,307 |
| Maryland | 42,210 | 1,766 | | | | | 42,210 | 1,766 |
| Massachusetts | 373,670 | 9,507 | | | | | 373,670 | 9,507 |
| Michigan | | | | | 30,393 | 2,156 | 30,393 | 2,156 |
| Minnesota | | | 3,498 | 138 | 10,735 | 297 | 14,233 | 435 |
| Mississippi | 22,153 | 652 | 2,650 | 123 | | | 24,803 | 775 |
| Missouri | | | 928 | 77 | | | 928 | 77 |
| Nebraska | | | 145 | 16 | | | 145 | 16 |
| New Hampshire | 523 | 57 | | | | | 523 | 57 |
| New Jersey | 93,263 | 2,146 | | | | | 93,263 | 2,146 |
| New York | 39,911 | 2,453 | | | 1,432 | 99 | 41,343 | 2,552 |
| North Carolina | 163,462 | 1,672 | | | | | 163,462 | 1,672 |
| Ohio | | | 185 | 7 | 27,670 | 1,157 | 27,855 | 1,164 |
| Oklahoma | | | 40 | 4 | | | 40 | 4 |
| Oregon | 26,458 | 1,457 | | | | | 26,458 | 1,457 |
| Pennsylvania | 52 | 3 | | | 3,572 | 208 | 3,624 | 211 |
| Rhode Island | 17,366 | 1,001 | | | | | 17,366 | 1,001 |
| South Carolina | 5,891 | 225 | | | | | 5,891 | 225 |
| South Dakota | | | 114 | 11 | | | 114 | 11 |
| Tennessee | | | 3,435 | 104 | | | 3,435 | 104 |
| Texas | 25,869 | 912 | 139 | 6 | | | 26,008 | 918 |
| Virginia | 246,801 | 4,177 | | | | | 246,801 | 4,177 |
| Washington | 113,469 | 6,305 | | | | | 113,469 | 6,305 |
| Wisconsin | | | 2,645 | 68 | 20,701 | 1,064 | 23,346 | 1,132 |
| Alaska | 819,269 | 11,958 | | | | | 819,269 | 11,958 |
| Total | 3,770,376 | 66,093 | 82,383 | 2,897 | 98,020 | 5,173 | 3,950,779 | 74,163 |

SEED OYSTER FISHERY

| Item | New England, 1933 | Middle Atlantic, 1933 |
|---|---|---|
| OPERATING UNITS | | |
| Fishermen: | *Number* | *Number* |
| On vessels | 93 | 1,586 |
| On boats and shore: | | |
| Regular | 5 | 298 |
| Casual | 160 | 150 |
| Total | 258 | 2,034 |
| Vessels: | | |
| Steam | 3 | |
| Net tonnage | 245 | |
| Motor | 18 | 7 |
| Net tonnage | 271 | 69 |
| Sail | 2 | 146 |
| Net tonnage | 17 | 2,977 |
| Total vessels | 23 | 153 |
| Total net tonnage | 533 | 3,046 |

[8] The catch for "Marine and coastal rivers" and "Lakes" is for 1934 except in the New England and Middle Atlantic States, which is for 1933. The catch for "Mississippi River and tributaries" is for 1931.

[9] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee and several mussel-bearing streams tributary to Lakes Huron, Erie, and Michigan.

*Fisheries of the United States and Alaska*—Continued

SEED OYSTER FISHERY—Continued

| Item | New England, 1933 | | Middle Atlantic, 1933 | |
|---|---|---|---|---|
| OPERATING UNITS—continued | | | | |
| Boats: | *Number* | | *Number* | |
| Motor | 7 | | 206 | |
| Other | 90 | | 152 | |
| Apparatus: | | | | |
| Dredges, oyster | 101 | | 300 | |
| Yards at mouth | 97 | | 363 | |
| Tongs | 96 | | 374 | |
| Rakes | 46 | | 79 | |
| CATCH | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public, spring | 31,458 | $12,684 | 1,003,540 | $261,862 |
| Seed, public, fall | 43,163 | 17,265 | 23,500 | 8,250 |
| Seed, private, spring | 207,185 | 69,617 | 40,290 | 39,540 |
| Seed, private, fall | | | 38,290 | 38,290 |
| Total | 281,806 | 99,566 | 1,105,620 | 347,942 |

| Item | Chesapeake, 1934 | | South Atlantic and Gulf, 1934 | | Total | |
|---|---|---|---|---|---|---|
| OPERATING UNITS | | | | | | |
| Fishermen: | *Number* | | *Number* | | *Number* | |
| On vessels | 28 | | | | 1,707 | |
| On boats and shore: | | | | | | |
| Regular | 1,005 | | 12 | | 1,320 | |
| Casual | 120 | | | | 430 | |
| Total | 1,153 | | 12 | | 3,457 | |
| Vessels: | | | | | | |
| Steam | 7 | | | | 10 | |
| Net tonnage | 69 | | | | 314 | |
| Motor | 1 | | | | 26 | |
| Net tonnage | 23 | | | | 363 | |
| Sail | | | | | 148 | |
| Net tonnage | | | | | 2,994 | |
| Total vessels | 8 | | | | 184 | |
| Total net tonnage | 92 | | | | 3,671 | |
| Boats: | | | | | | |
| Motor | 558 | | | | 771 | |
| Other | 36 | | 6 | | 284 | |
| Apparatus: | | | | | | |
| Dredges, oyster | 10 | | 12 | | 423 | |
| Yards at mouth | 19 | | 12 | | 491 | |
| Tongs | 1,131 | | | | 1,601 | |
| Rakes | | | | | 125 | |
| CATCH | | | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public, spring | 1,156,083 | $174,024 | 17,450 | $2,617 | 2,208,531 | $451,187 |
| Seed, public, fall | 867,342 | 130,708 | | | 934,005 | 156,223 |
| Seed, private, spring | 32,868 | 1,643 | | | 280,343 | 110,800 |
| Seed, private, fall | 32,868 | 1,644 | | | 71,158 | 39,934 |
| Total | 2,089,161 | 308,019 | 17,450 | 2,617 | 3,494,037 | 758,144 |

NOTE.—Of the number of persons fishing for seed oysters, a total of 3,033 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 93 vessels, 540 motor boats, 212 other boats, 192 dredges, 1,396 tongs, and 61 rakes.

*Yield of the fisheries of the United States: By gear*

| Gear | New England, 1933 | | Middle Atlantic, 1933 | | Chesapeake, 1934 | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Purse seines | 56,586,422 | $796,362 | 77,945,874 | $205,503 | 143,009,600 | $596,380 |
| Haul seines | 910,017 | 32,041 | 1,845,557 | 70,568 | 4,536,400 | 158,251 |
| Gill nets | 18,593,520 | 359,016 | 2,517,827 | 117,750 | 1,378,000 | 114,672 |
| Lines | 99,382,952 | 2,167,473 | 7,633,174 | 292,745 | 29,941,200 | 552,436 |
| Pound nets | 14,419,422 | 227,622 | 28,325,529 | 692,557 | 56,095,000 | 1,197,115 |
| Floating traps | 8,458,029 | 159,754 | | | | |
| Other traps | 28,910 | 2,512 | | | | |
| Weirs | 21,801,005 | 92,599 | 893,336 | 2,485 | | |
| Stop nets | | | 208,874 | 20,472 | 22,100 | 448 |
| Fyke nets | 81,216 | 3,192 | 694,092 | 21,736 | 1,098,200 | 50,846 |
| Dip nets | 3,640,232 | 45,571 | 86,022 | 16,852 | 2,778,300 | 231,038 |
| Cast nets | | | 400 | 48 | | |
| Scap nets | | | 149,664 | 8,574 | | |
| Bag and pocket nets | 116,068 | 13,039 | | | | |
| Drag nets | | | 51,900 | 10,855 | | |
| Push nets | 18,000 | 7,000 | | | | |
| Otter trawls | 235,003,844 | 5,296,742 | 24,410,956 | 780,076 | 4,567,200 | 113,071 |
| Pots | 15,081,503 | 1,673,370 | [2] 2,369,400 | [2] 203,269 | 166,600 | 11,828 |
| Harpoons | 3,481,594 | 406,727 | 102,386 | 12,549 | | |
| Spears | 106,663 | 7,537 | 126,568 | 12,682 | 1,800 | 180 |
| Scrapes, crab | | | | | 1,342,100 | 71,682 |
| Dredges | 8,311,071 | 1,224,218 | 17,238,166 | 1,698,835 | 15,069,200 | 820,679 |
| Tongs | 1,443,961 | 202,993 | 2,618,049 | 372,867 | 27,646,300 | 1,795,459 |
| Rakes | 1,129,890 | 145,761 | 1,281,227 | 179,516 | 374,600 | 30,198 |
| Forks | 2,811,825 | 283,046 | 171,093 | 29,770 | | |
| Hoes | 8,378,980 | 333,750 | 913,560 | 45,752 | | |
| Picks | | | | | 269,400 | 40,416 |
| Gaffs | | | 750 | 75 | | |
| By hand | 151,015 | 5,225 | 169,331 | 15,519 | 714,900 | 158,731 |
| Total | 499,936,139 | 13,485,550 | 169,753,735 | 4,811,055 | 289,010,900 | 5,943,410 |

| Gear | South Atlantic and Gulf, 1934 | | Pacific, 1934 | | Lakes, 1934 | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Purse seines | 164,367,700 | $553,133 | 906,342,200 | $5,390,907 | | |
| Haul seines | 36,138,600 | 990,725 | 6,022,900 | 339,077 | 4,176,000 | $89,287 |
| Gill nets | 48,900,500 | 1,598,648 | 27,358,500 | 1,409,810 | 44,432,900 | 2,547,455 |
| Trammel nets | 5,655,000 | 290,441 | 848,000 | 64,130 | 218,500 | 4,051 |
| Lines | 32,049,700 | 978,492 | 159,150,300 | 7,226,138 | 2,394,600 | 278,599 |
| Pound nets | 19,218,900 | 304,045 | 21,517,500 | 1,276,083 | 10,902,100 | 494,978 |
| Other traps | 520,100 | 65,700 | | | 28,686,600 | 1,546,336 |
| Weirs | 3,000 | 90 | 236,400 | 1,466 | | |
| Wheels | 450,000 | 2,500 | 320,500 | 23,545 | | |
| Stop nets | 563,400 | 16,674 | | | | |
| Fyke nets | 146,600 | 4,516 | 247,700 | 21,617 | 2,430,500 | 106,628 |
| Dip nets | 3,745,200 | 109,531 | 2,673,300 | 48,504 | | |
| Drag bag nets | | | 1,521,000 | 28,155 | | |
| Cast nets | 642,200 | 14,240 | | | | |
| Push nets | [1] 5,800 | [1] 975 | | | | |
| Reef nets | | | 23,800 | 1,120 | | |
| Lampara nets | | | 385,368,400 | 1,855,358 | | |
| Paranzella nets | | | 12,505,800 | 581,830 | | |
| Otter trawls | 113,248,200 | 2,914,053 | 1,363,500 | 43,364 | | |
| Beam trawls | | | 522,000 | 14,459 | | |
| Pots | 1,426,500 | 61,204 | 8,293,100 | 652,317 | 35,600 | 3,200 |
| Harpoons | | | 4,323,200 | 131,338 | | |
| Spears | 153,800 | 10,213 | | | | |
| Dredges | 8,148,000 | 545,011 | (3) | (3) | | |
| Tongs | 7,636,200 | 508,060 | [3] 6,819,200 | [3] 736,099 | | |
| Crowfoot bars | | | | | 1,681,800 | 29,125 |
| Rakes | 367,100 | 38,772 | (3) | (3) | | |
| Forks | 134,200 | 5,988 | | | | |
| Grabs | 2,991,100 | 103,656 | | | | |
| Picks | | | | | 251,300 | 4,723 |
| Hooks | 240,400 | 250,269 | | | | |
| Diving apparatus, abalone and sponge | 417,400 | 587,456 | 644,700 | 104,742 | 35,200 | 679 |
| By hand | 744,300 | 39,268 | | | 1,166,100 | 18,674 |
| Total | 447,913,900 | 9,993,660 | 1,546,102,000 | 19,950,059 | 96,411,200 | 5,123,735 |

[1] This catch was made by scoop nets.
[2] Includes the catch by baskets.
[3] The catch by shovels, rakes, and dredges is included with tongs.

*Yield of the fisheries of the United States: By gear*—Continued

| Gear | Mississippi River and tributraries, 1931 | | Total | |
|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* |
| Purse seines | | | 1,348,251,796 | $7,542,285 |
| Haul seines | 13,739,657 | $574,541 | 67,369,131 | 2,254,470 |
| Gill nets | 166,598 | 6,547 | 143,347,845 | 6,153,898 |
| Trammel nets | 1,134,206 | 75,615 | 7,855,706 | 434,237 |
| Lines | 10,140,037 | 772,245 | 340,691,963 | 12,268,128 |
| Pound nets | 224,275 | 9,541 | 150,702,726 | 4,201,941 |
| Floating traps | | | 8,458,029 | 159,754 |
| Other traps | | | 29,235,610 | 1,614,548 |
| Weirs | | | 22,933,741 | 96,640 |
| Wheels | | | 770,500 | 26,045 |
| Stop nets | | | 794,374 | 37,594 |
| Fyke nets | 18,507,204 | 797,130 | 23,205,512 | 1,005,665 |
| Dip nets | 30,045 | 3,307 | 12,953,099 | 454,803 |
| Drag bag uets | | | 1,521,000 | 28,155 |
| Cast nets | | | 642,600 | 14,288 |
| Scap nets | | | 149,664 | 8,574 |
| Bag and pocket nets | | | 116,068 | 13,039 |
| Drag nets | | | 51,900 | 10,855 |
| Push nets | | | 23,800 | 7,975 |
| Reef nets | | | 23,800 | 1,120 |
| Lampara nets | | | 385,368,400 | 1,855,358 |
| Paranzella nets | | | 12,505,800 | 581,830 |
| Otter trawls | | | 378,593,700 | 9,147,306 |
| Beam trawls | | | 522,000 | 14,459 |
| Pots | [2] 310,455 | [2] 26,277 | 27,683,158 | 2,631,465 |
| Harpoons | | | 7,907,180 | 550,614 |
| Spears | 2,250 | 270 | 391,081 | 30,882 |
| Scrapes, crab | | | 1,342,100 | 71,682 |
| Dredges | 3,699,100 | 40,958 | 52,465,537 | 4,329,701 |
| Tongs | 1,601,876 | 21,091 | 47,765,586 | 3,636,569 |
| Crowfoot bars | 20,893,550 | 265,443 | 22,575,350 | 294,568 |
| Rakes | 370,130 | 4,029 | 3,522,947 | 398,276 |
| Forks | 4,812,737 | 76,214 | 7,929,855 | 395,018 |
| Hoes | | | 9,292,540 | 379,502 |
| Grabs | 873,099 | 130,621 | 3,864,199 | 234,277 |
| Picks | | | 520,700 | 45,139 |
| Hooks | | | 240,400 | 250,269 |
| Diving apparatus, abalone and sponge | | | 1,097,300 | 692,877 |
| Gaffs | | | 750 | 75 |
| By hand | 5,877,304 | 93,528 | 8,822,950 | 330,945 |
| Total | 82,382,523 | 2,897,357 | 3,131,510,397 | 62,204,826 |

[2] Includes catch by baskcts.

*Industries related to the fisheries of the United States and Alaska*

| Item | New England, 1933 | Middle Atlantic, 1933 | Chesapeake, 1934 | South Atlantic and Gulf, 1934 |
|---|---|---|---|---|
| Transporting: | | | | |
| Persons engaged: | *Number* | *Number* | *Number* | *Number* |
| On vessels | 256 | 110 | 971 | 397 |
| On boats | 54 | 92 | 137 | 181 |
| Total | 310 | 202 | 1,108 | 578 |
| Vessels: | | | | |
| Steam | 1 | | 1 | |
| Net tonnage | 67 | | 103 | |
| Motor | 104 | 30 | 433 | 157 |
| Net tonnage | 1,615 | 629 | 5,336 | 1,631 |
| Sail | | | 15 | 33 |
| Net tonnage | | | 387 | 301 |
| Total vessels | 105 | 30 | 449 | 190 |
| Total net tonnage | 1,682 | 629 | 5,826 | 1,932 |
| Boats | 31 | 87 | 111 | 168 |
| Wholesale and manufacturing: | | | | |
| Establishments | 362 | 398 | 544 | 591 |
| Persons engaged: | | | | |
| Proprietors | 266 | 358 | 689 | 637 |
| Salaried employees | 799 | 1,067 | 363 | 409 |
| Wage earners: | | | | |
| Average for season | 8,112 | 4,206 | 11,465 | 13,308 |
| Average for year | 4,170 | 2,948 | 5,054 | 4,200 |
| Salaries and wages paid | $5,410,072 | $6,085,981 | $2,758,749 | $2,873,812 |
| Manufactured products [4] | [5] $17,604,594 | [5] $10,998,508 | $7,826,195 | $9,906,595 |
| Fishermen's manufactured products: | | | | |
| Persons engaged | 2,223 | 512 | 134 | 987 |
| Products [4] | $553,235 | $260,146 | $11,228 | $129,700 |

[4] Includes packaged, cured, and canned fishery products and byproducts.
[5] Includes data for 1934 on packaged and canned products and byproducts.

*Industries related to the fisheries of the United States and Alaska*—Continued

| Item | Pacific, 1934 | Lakes, 1934 | Mississippi River and tributaries, 1931 | Alaska, 1934 | Total for the various years |
|---|---|---|---|---|---|
| Transporting: | | | | | |
| Persons engaged: | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 263 | 15 | 29 | 1,758 | 3,799 |
| On boats | | | | (1) | 464 |
| Total | 263 | 15 | 29 | 1,758 | 4,263 |
| Vessels: | | | | | |
| Steam | 1 | | | 11 | 14 |
| Net tonnage | 32 | | | 19,967 | 20,169 |
| Motor | 111 | 8 | 8 | 367 | 1,218 |
| Net tonnage | 2,430 | 114 | 104 | 14,060 | 25,919 |
| Sail | | | | | 48 |
| Net tonnage | | | | | 688 |
| Total vessels | 112 | 8 | 8 | 378 | 1,280 |
| Total net tonnage | 2,462 | 114 | 104 | 34,027 | 46,776 |
| Boats | | | | [2] 708 | 1,105 |
| Wholesale and manufacturing: | | | | | |
| Establishments | 323 | 238 | 217 | 231 | 2,904 |
| Persons engaged: | | | | | |
| Proprietors | 358 | 173 | 204 | 14,999 | 77,599 |
| Salaried employees | 816 | 521 | 355 | | |
| Wage earners: | | | | | |
| Average for season | 12,046 | 2,173 | 4,275 | | |
| Average for year | 5,059 | 1,152 | 3,483 | (3) | (3) |
| Salaries and wages paid | $7,031,444 | $2,442,879 | $3,080,430 | (3) | (3) |
| Manufactured products [4] | $41,007,888 | $2,696,035 | [5] $3,318,829 | $40,681,925 | $134,040,569 |
| Fishermen's manufactured products: | | | | | |
| Persons engaged | 195 | 535 | 216 | (3) | (3) |
| Products [4] | $235,549 | $67,850 | $8,751 | (3) | (3) |

[1] Included in vessels.
[2] Includes scows, houseboats, pile drivers, etc.
[3] Statistics not available.
[4] Includes packaged, cured, and canned fishery products and by products.
[5] Includes data for 1934 on packaged and canned products and byproducts.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products, 4,061 have also been included as fishermen, and 872 of the persons shown on transporting craft have also been included as fishermen.

## MANUFACTURED FISHERY PRODUCTS

Statistics of the output of the various manufactured fishery products have been collected in considerably more detail for 1930, 1931, 1933, and 1934 than in previous years. In addition to statistics of the production of cured fishery products, canned fishery products, and fishery byproducts, data also have been collected on the output of packaged fishery products, including shucked oysters, fresh-cooked crab meat, and similar commodities, in the more recent surveys.

Since only a part of the United States was surveyed for general fishery statistics for 1934, the following compilation of manufactured fishery products consists of composite data based on the most recent statistics. The years covered by the data are indicated by footnotes.

*Manufactured fishery products of the United States and Alaska* [1]

| Item | | Quantity | Value |
|---|---|---|---|
| Alewives: | | | |
| Salted: | | | |
| Corned [2] | pounds | 6,523,375 | $77,004 |
| Tight-pack cut [2] | do | 1,694,538 | 35,392 |
| Tight-pack roe | do | 106,900 | 5,275 |
| Pickled | do | [3] 2,395,390 | 108,005 |
| Spiced | do | 383,500 | 54,925 |
| Smoked [2] | do | 246,435 | 8,175 |
| Canned | standard cases | 18,499 | 54,044 |
| Roe, canned | do | 19,132 | 83,331 |
| Dry scrap | tons | 520 | 16,508 |
| Oil | gallons | 13,250 | 1,505 |

See footnotes at end of table.

*Manufactured fishery products of the United States and Alaska*—Continued

| Item | | Quantity | Value |
|---|---|---|---|
| Barracuda, fresh fillets | pounds | 560,000 | $67,200 |
| Bluefish, smoked [4] | do | 250 | 46 |
| Buffalofish, smoked [5] | do | 470,700 | 136,295 |
| Butterfish, smoked [5] | do | 615,824 | 150,065 |
| Cabrilla, fresh fillets | do | 120,000 | 14,650 |
| Carp, smoked [5] | do | 215,922 | 65,476 |
| Cisco, chubs, tullibee, and lake herring, smoked [4] | do | 7,829,264 | 1,642,384 |
| Cod: | | | |
| Fresh fillets | do | 9,044,817 | 1,080,506 |
| Frozen fillets | do | 5,902,505 | 565,016 |
| Fresh steaks and sticks | do | 291,453 | 31,861 |
| Salted: | | | |
| Green [2] | do | [3] 6,944,569 | 293,899 |
| Green in process, partly boned | do | 2,255,775 | 155,966 |
| Dry [2] | do | 1,177,449 | 63,579 |
| Boneless, including absolutely boneless [2] | do | 8,992,565 | 1,636,843 |
| Tongues | do | 2,600 | 130 |
| Stockfish | do | 23,400 | 2,403 |
| Smoked fillets [4] | do | 1,128,228 | 167,659 |
| Oil: | | | |
| Cod | gallons | 51,132 | 22,149 |
| Cod liver | do | 94,312 | 56,643 |
| Croaker, fresh fillets | pounds | 38,500 | 3,780 |
| Croaker, fresh, pandressed | do | 563,000 | 30,360 |
| Cusk: | | | |
| Fresh fillets | do | 425,033 | 54,847 |
| Frozen fillets | do | 86,097 | 5,824 |
| Fresh steaks | do | 327,546 | 36,219 |
| Salted: | | | |
| Green [4] | do | [3] 61,650 | 1,288 |
| Dry [4] | do | 33,972 | 1,593 |
| Boneless, including absolutely boneless [4] | do | 28,835 | 3,469 |
| Smoked fillets [3] | do | 195,803 | 25,334 |
| Eels: | | | |
| Smoked [5] | do | 101,000 | 27,140 |
| Pickled and salted [2] | do | 102,200 | 6,936 |
| Flounders: | | | |
| Fresh fillets | do | 4,189,900 | 657,621 |
| Frozen fillets | do | 458,430 | 64,145 |
| Grayfish, fresh fillets | do | 130,000 | 13,000 |
| Groupers, fresh steaks and fillets | do | 385,561 | 56,428 |
| Haddock: | | | |
| Fresh fillets | do | 17,378,226 | 2,047,664 |
| Frozen fillets | do | 19,226,422 | 1,742,139 |
| Fresh sticks | do | 61,422 | 11,206 |
| Salted: | | | |
| Green [4] | do | [3] 45,765 | 1,091 |
| Dry [4] | do | 52,032 | 2,550 |
| Boneless, including absolutely boneless [4] | do | 98,295 | 19,220 |
| Smoked fillets [4] | do | 149,214 | 26,928 |
| Finnan haddie [4] | do | 1,171,354 | 134,818 |
| Hake: | | | |
| Fresh fillets | do | 1,192,794 | 120,116 |
| Frozen fillets | do | 164,449 | 12,159 |
| Fresh sticks | do | 326,726 | 36,244 |
| Salted: | | | |
| Green [4] | do | [3] 408,653 | 11,195 |
| Dry [4] | do | 277,670 | 8,896 |
| Boneless, including absolutely boneless [4] | do | 581,201 | 47,851 |
| Smoked fillets [4] | do | 33,282 | 4,586 |
| Halibut: | | | |
| Fresh fillets and steaks | do | 95,679 | 23,204 |
| Frozen steaks | do | 146,124 | 22,843 |
| Herring, lake: | | | |
| Fresh fillets | do | 144,935 | 13,344 |
| Salted | do | 5,599,920 | 193,975 |
| Herring, sea: | | | |
| Salted [2] | do | 100,900 | 3,297 |
| Roused | do | 513,050 | 16,854 |
| Spiced [2] | do | 436,816 | 39,289 |
| Pickled [2] | do | 540,100 | 11,055 |
| Scotch cure | do | 7,409,200 | 445,476 |
| Norwegian cure | do | 230,540 | 8,298 |
| Dry salted | do | 80,400 | 2,701 |
| Smoked: | | | |
| Bloaters, hard [2] | do | 961,142 | 45,887 |
| Bloaters, soft [4] | do | 886,994 | 64,636 |
| Bloaters, unclassified | do | 72,550 | 5,804 |
| Boneless [4] | do | 1,953,365 | 187,020 |
| Lengthwise [4] | do | 114,915 | 9,456 |
| Medium scale [4] | do | 171,870 | 14,597 |
| Kippered [2] | do | 238,355 | 29,093 |
| Miscellaneous | do | 53,000 | 4,770 |

See footnotes at end of table.

*Manufactured fishery products of the United States and Alaska*—Continued

| Item | | Quantity | Value |
|---|---|---|---|
| Herring, sea—Continued. | | | |
| Canned "sardines" | standard cases | 1,142,730 | $3,315,190 |
| Pearl essence | pounds | 13,805 | 103,475 |
| Dry scrap | tons | 1,297 | 38,122 |
| Meal | do | 15,179 | 476,958 |
| Oil | gallons | 3,772,099 | 641,839 |
| Lake trout: | | | |
| Fresh fillets | pounds | 11,865 | 2,529 |
| Smoked | do | 545,398 | 131,286 |
| Salted | do | 25,000 | 1,240 |
| "Lingcod", fresh fillets | do | 147,500 | 17,340 |
| Mackerel: | | | |
| Fresh fillets | do | 80,200 | 9,854 |
| Frozen fillets | do | 213,177 | 18,327 |
| Salted: | | | |
| Fillets [4] | do | 1,767,946 | 133,266 |
| Split [4] | do | 1,396,180 | 95,396 |
| Miscellaneous | do | 700 | 49 |
| Smoked [2] | do | 176,690 | 28,477 |
| Canned | standard cases | 1,275,419 | 3,244,944 |
| Meal | tons | 3,323 | 98,392 |
| Oil | gallons | 157,571 | 25,533 |
| Menhaden: | | | |
| Acid scrap | tons | 22,051 | 381,559 |
| Dry scrap | do | 32,450 | 1,040,745 |
| Meal | do | 5,485 | 206,952 |
| Oil | gallons | 3,612,364 | 705,657 |
| Mullet: | | | |
| Salted | pounds | 880,100 | 41,209 |
| Smoked | do | 4,500 | 1,175 |
| Roe, salted | do | 153,930 | 9,291 |
| Paddlefish: | | | |
| Smoked [6] | do | 363,800 | 163,260 |
| Roe, salted [7] | do | 1,595 | 812 |
| Pike, blue, yellow, and sauger: | | | |
| Fresh fillets | do | 2,147,059 | 417,891 |
| Frozen fillets | do | 540,064 | 100,360 |
| Pilchard: | | | |
| Canned "sardines" | standard cases | 1,970,047 | 5,481,391 |
| Meal | tons | 89,280 | 2,878,269 |
| Oil | gallons | 20,845,171 | 4,413,609 |
| Pollock: | | | |
| Fresh fillets and steaks | pounds | 1,344,375 | 110,486 |
| Frozen fillets | do | 3,051,405 | 189,941 |
| Salted: | | | |
| Green [4] | do | [3] 114,145 | 2,275 |
| Dry [4] | do | 983,829 | 39,119 |
| Rockfishes, fresh fillets | do | 934,500 | 119,870 |
| Rosefish, fresh fillets | do | 17,760 | 2,191 |
| Sablefish: | | | |
| Fresh fillets | do | 459,000 | 45,900 |
| Salted | do | 291,006 | 17,037 |
| Kippered [8] | do | 631,282 | 96,971 |
| Smoked | do | 30,142 | 7,220 |
| Salmon: | | | |
| Fresh fillets and steaks | do | 45,095 | 11,224 |
| Frozen fillets and steaks | do | 32,103 | 5,048 |
| Salted: | | | |
| Pickled in brine | do | 396,665 | 29,774 |
| Mild cured | do | [3] 9,828,952 | 1,841,481 |
| Caviar | do | 158,078 | 20,141 |
| Miscellaneous | do | 1,439,650 | 58,094 |
| Smoked [5] | do | 8,321,240 | 2,347,532 |
| Kippered [2] | do | 2,377,887 | 468,737 |
| Canned: | | | |
| Chinook or king | standard cases | 324,807 | 3,171,601 |
| Blueback, red or sockeye | do | 2,988,327 | 21,359,600 |
| Silver or coho | do | 371,683 | 2,303,514 |
| Humpback or pink | do | 3,826,823 | 15,680,145 |
| Chum or keta | do | 855,314 | 3,149,341 |
| Steelhead trout | do | 16,082 | 153,696 |
| Meal | tons | 1,737 | 46,468 |
| Oil | gallons | 202,458 | 57,306 |
| Eggs for food, canned | standard cases | 860 | 20,164 |
| Eggs for bait, canned | do | 5,044 | 128,453 |
| Sea bass: | | | |
| Black, fresh fillets | pounds | 485,000 | 54,000 |
| White, fresh fillets | do | 168,500 | 26,565 |
| Shad: | | | |
| Mild cured | do | 52,800 | 3,200 |
| Smoked and kippered [2] | do | 247,142 | 48,578 |
| Canned | standard cases | 8,233 | 24,458 |
| Roe canned | do | 2,118 | 58,857 |

See footnotes at end of table.

*Manufactured fishery products of the United States and Alaska*—Continued

| Item | | Quantity | Value |
|---|---|---|---|
| Sheepshead: | | | |
| Fresh fillets | pounds | 47,845 | $6,643 |
| Frozen fillets | do | 1,348 | 135 |
| Smoked [7] | do | 617 | 77 |
| Snapper, red: | | | |
| Fresh fillets and steaks | do | 65,335 | 13,274 |
| Squeteagues: | | | |
| Fresh fillets | do | 115,300 | 10,446 |
| Fresh pandressed | do | 965,000 | 54,350 |
| Squirrel hake, smoked [4] | do | 50 | 5 |
| Sturgeon: | | | |
| Smoked and kippered [5] | do | 1,523,602 | 780,944 |
| Salted roe [5] | do | 402 | 338 |
| Caviar, canned | standard cases | 3,128 | 397,036 |
| Swordfish, fresh fillets and steaks | pounds | 110,289 | 32,465 |
| Totuava, fresh fillets | do | 365,000 | 54,750 |
| Trout (Dolly Varden), dried | do | 1,500 | 30 |
| Tuna and tunalike fishes: | | | |
| Canned: | | | |
| Albacore | standard cases | 90,599 | 512,319 |
| Bluefin | do | 312,198 | 1,420,733 |
| Bonito | do | 58,083 | 234,598 |
| Striped | do | 226,359 | 1,034,799 |
| "Tonno" | do | 167,484 | 1,082,318 |
| Yellowfin | do | 1,100,772 | 5,680,503 |
| Yellowtail | do | 11,448 | 44,272 |
| Meal | tons | 6,705 | 191,015 |
| White bass: | | | |
| Fresh fillets | pounds | 26,746 | 3,951 |
| Frozen fillets | do | 9,528 | 1,158 |
| Whitefish: | | | |
| Fresh fillets | do | 5,771 | 744 |
| Smoked [5] | do | 2,419,473 | 639,571 |
| Caviar, canned | standard cases | 912 | 37,678 |
| Whiting, smoked [4] | pounds | 50 | 5 |
| Wolffish: | | | |
| Fresh fillets | do | 75,800 | 10,387 |
| Frozen fillets | do | 254,830 | 24,079 |
| Yellow perch: | | | |
| Fresh fillets | do | 2,680,559 | 507,214 |
| Frozen fillets | do | 219,239 | 37,472 |
| Crabs: | | | |
| Meat, packaged, fresh cooked [2] | do | 5,574,331 | 1,903,949 |
| Canned | standard cases | 11,614 | 191,532 |
| Dry scrap and meal | tons | 1,713 | 26,475 |
| Crabs, king, meal and dry scrap | do | 702 | 24,717 |
| Lobsters: | | | |
| Common, packaged, fresh cooked [2] | pounds | 939,020 | 307,420 |
| Spiny packaged, fresh cooked | do | 56,500 | 21,738 |
| Shrimp: | | | |
| Frozen, packaged | do | 2,299,800 | 379,467 |
| Sun dried | do | 1,860,775 | 279,714 |
| Cooked and peeled | do | 1,367,016 | 315,789 |
| Canned | standard cases | 1,021,822 | 4,403,077 |
| Meal or "bran" | tons | 1,212 | 23,569 |
| Abalone, steaks | pounds | 627,300 | 183,990 |
| Clams, hard: | | | |
| Fresh shucked [2] | gallons | 13,646 | 21,781 |
| Canned: | | | |
| Whole | standard cases | 17,962 | 89,689 |
| Chowder | do | 349,955 | 1,448,483 |
| Minced | do | 15,206 | 77,861 |
| Broth, bouillon and cocktail | do | 5,981 | 34,256 |
| Juice and nectar | do | 8,820 | 38,945 |
| Clams, razor: | | | |
| Fresh shucked [4] | gallons | 36,078 | 17,729 |
| Canned: | | | |
| Whole | standard cases | 1,143 | 9,994 |
| Minced | do | 49,160 | 386,833 |
| Juice | do | 126 | 378 |
| Clams, soft: | | | |
| Fresh shucked [4] | gallons | 129,286 | 120,024 |
| Steamed [4] | pounds | [3] 161,887 | 11,279 |
| Canned: | | | |
| Whole | standard cases | 89,871 | 321,399 |
| Chowder | do | 82,027 | 269,420 |
| Juice and bouillon | do | 12,804 | 35,970 |
| Clams, surf, fresh shucked [4] | gallons | 5,922 | 4,050 |
| Clam shells, ground, poultry feed | tons | 1,735 | 16,662 |

See footnotes at end of table.

*Manufactured fishery products of the United States and Alaska*—Continued

| Item | | Quantity | Value |
|---|---|---|---|
| Marine-shell products: | | | |
| Buttons | gross | 4, 639, 176 | $2, 880, 341 |
| Novelties | | | 536, 519 |
| Mussels, fresh water, shell products: | | | |
| Buttons | gross | 14, 512, 880 | 3, 502, 233 |
| Novelties | | | 137, 166 |
| Lime | tons | 1, 938 | 4, 427 |
| Poultry feed | do | 6, 890 | 41, 010 |
| Oysters: | | | |
| Eastern: | | | |
| Fresh shucked [2] | gallons | 5, 908, 748 | 7, 231, 854 |
| Canned | standard cases | 369, 045 | 1, 548, 423 |
| Japanese: | | | |
| Fresh shucked | gallons | 265, 441 | 353, 051 |
| Canned | standard cases | 69, 497 | 322, 637 |
| Native, Pacific, fresh shucked | gallons | 32, 334 | 187, 538 |
| Shell products: | | | |
| Poultry feed | tons | 250. 509 | 1, 287, 440 |
| Lime | do | 45, 100 | 113, 324 |
| Lime, "burned" | do | 9, 277 | 51, 510 |
| Scallops, bay, fresh shucked [2] | gallons | 83, 122 | 271, 947 |
| Scallops, sea, fresh shucked [2] | do | 381, 798 | 397, 933 |
| Turtles and terrapin, meat and soup, canned | standard cases | 3, 204 | 58, 232 |
| Whales: | | | |
| Meal, meat | tons | 1, 349 | 37, 505 |
| Oil, whale | gallons | 1, 060, 950 | 246, 670 |
| Oil, sperm | do | 79, 000 | 17, 530 |
| Unclassified products: | | | |
| Fillets, fresh | pounds | [9] 92, 300 | 9, 316 |
| Fillets, frozen | do | [10] 831, 670 | 94, 503 |
| Miscellaneous, packaged, fresh and frozen | do | [11] 2, 769, 901 | 246, 034 |
| Salted [2] | do | [12] 257, 342 | 21, 652 |
| Smoked [2] | do | [13] 38, 912 | 10, 203 |
| Canned: | | | |
| Fish for cat and dog food | standard cases | 301, 508 | 823, 440 |
| Fish cakes, etc | do | 77, 595 | 609, 889 |
| Fish flakes | do | 36, 540 | 326, 372 |
| Other | do | [14] 58, 921 | 351, 527 |
| Acid, dry and green scrap | tons | 1, 574 | 35, 384 |
| Meal | do | 12, 914 | 564, 425 |
| Oil | gallons | [15] 76, 395 | 195, 368 |
| Glue | do | 398, 860 | 804, 688 |
| Other byproducts | | | [16] 378, 838 |
| Total, fresh and frozen packaged products [2] | pounds | 150, 592, 819 | 20, 678, 362 |
| Total, cured products [5] | do | 98, 141, 332 | 13, 047, 069 |
| Total, canned | do | 700, 157, 272 | 80, 021, 342 |
| Total, byproducts | | | 22, 608, 219 |
| Grand total | | | 136, 354, 992 |

[1] Data are for 1934 unless otherwise indicated.
[2] This item represents a combination of 1934 and 1933 data.
[3] This is usually an intermediate product and although shown in the total may also be shown in its final stage of processing elsewhere in the table.
[4] Data are for 1933.
[5] This item represents a combination of 1934, 1933, and 1931 data.
[6] This item represents a combination of 1933 and 1931 data.
[7] Data are for 1931.
[8] This item represents a combination of 1934 and 1931 data.
[9] Includes fresh fillets of bluefish, snook, Spanish mackerel, and whiting.
[10] Includes frozen fillets of groupers, lake herring, mullet, rosefish, red snapper, Spanish mackerel, squeteagues, and whiting.
[11] Includes fresh steaks of wolffish; frozen steaks of cod, swordfish, and wolffish; frozen pandressed croaker and squeteagues; frozen sticks of whiting; and fresh halibut cheeks.
[12] Includes salted barracuda, black and white sea bass, pilchard, sea herring fillets and splits, and spot; green-salted halibut; dry-salted tongues; spiced chubs; and pickled shrimp.
[13] Includes smoked bonito, cod, flounders, goosefish, halibut, herring, kingfish, mullet, smelt, and Spanish mackerel.
[14] Includes canned pickled eels; gefilte fish; ground-fish roe; haddock, finnan haddie, and chowder; herring canned for bait; tuna cocktail; conch chowder; oyster puree; pickled sea mussels; rat poison; squid; frog products; and miscellaneous canned fish and chowder.
[15] Includes miscellaneous fish oils.
[16] Includes alligator hides, isinglass, kelp products, shark fins and hides, salmon egg meal, clam meal, and mussel-shell stucco and chips.

NOTE.—Some of the above products may have been manufactured from products imported from another country; therefore, they cannot be correlated directly with the catch within the United States and Alaska.

## CANNED FISHERY PRODUCTS AND BYPRODUCTS TRADE

The output of canned fishery products and byproducts in the United States and Alaska in 1934 was valued at $102,619,379. Of this total, canned products comprised $80,021,342, and byproducts, $22,598,037—an increase of 34 percent in the value of canned products and 29 percent in the value of byproducts when compared with the respective values of the same groups of commodities for the previous year.

Fishery products were canned at 387 establishments in the United States and Alaska during 1934. The combined output of these canneries amounted to 17,378,902 standard cases. The net weight of the products canned amounted to 700,157,272 pounds.

Canned fishery products or byproducts were prepared in 27 States and in Alaska during 1934. Alaska ranked first in the value of the products, accounting for 38 percent of the total, and California ranked second with 27 percent.

*Canned fishery products and byproducts of the United States and Alaska, 1934*

SUMMARY OF PRODUCTION: BY COMMODITIES

| Product | Number of plants | Standard cases | Pounds | Value |
|---|---|---|---|---|
| Canned products: | | | | |
| Salmon: | | | | |
| United States | 42 | 901, 206 | 43. 257, 888 | $8, 205, 947 |
| Alaska | 110 | 7, 481, 830 | 359, 127, 840 | 37, 611, 950 |
| Sardines: | | | | |
| Maine | 22 | 1, 142, 730 | 28, 568, 250 | 3, 315, 190 |
| California | 20 | 1, 970, 047 | 94, 562, 256 | 5, 481, 391 |
| Tuna and tunalike fishes | 13 | 1, 966, 943 | 47, 206, 632 | 10, 009, 542 |
| Alewives | 8 | 18, 499 | 887, 952 | 54, 044 |
| Alewife roe | 24 | 19, 132 | 918, 336 | 83, 331 |
| Shad | 10 | 8, 233 | 395, 184 | 24, 458 |
| Shad roe | 10 | 2, 118 | 101, 664 | 58, 857 |
| Mackerel | 22 | 1, 275, 419 | 61, 220, 112 | 3, 244, 944 |
| Fish flakes | 3 | 36, 540 | 1, 753, 920 | 326, 372 |
| Fish cakes, balls, etc | 5 | 77, 595 | 3, 724, 560 | 609, 889 |
| Cat and dog food | 7 | 301, 508 | 14, 472, 384 | 823, 440 |
| Miscellaneous fish | 12 | 4, 366 | 209, 568 | 31, 945 |
| Sturgeon caviar | 6 | 3, 128 | 150, 144 | 397, 036 |
| Whitefish roe and caviar | 4 | 912 | 43, 776 | 37, 678 |
| Salmon eggs (for bait) | 9 | 5, 044 | 242, 112 | 128, 453 |
| Miscellaneous roe and caviar | 4 | 16, 518 | 792, 864 | 116, 173 |
| Oysters | 46 | 438, 542 | 6, 578, 130 | 1, 871, 060 |
| Shrimp | 51 | 1, 021, 822 | 16, 973, 860 | 4, 403, 077 |
| Clam products | 62 | [1] 633, 055 | 16, 391, 520 | 2, 713, 228 |
| Crabs | 14 | 11, 614 | 557, 472 | 191, 532 |
| Terrapin products | 3 | 52 | 2, 496 | 4, 606 |
| Turtle products | 3 | 3, 152 | 151, 296 | 53, 626 |
| Miscellaneous shellfish | 6 | 38, 897 | 1, 867, 056 | 223, 573 |
| Total | [2] 388 | 17, 378, 902 | 700, 157, 272 | 80, 021, 342 |

| Byproducts: | | Quantity | Value |
|---|---|---|---|
| Oyster-shell products | tons | 306, 621 | $1, 468, 936 |
| Fresh-water mussel-shell products | | | 3, 973, 153 |
| Marine pearl-shell products | | | 3, 416, 360 |
| Scrap, meal, etc | tons | 197, 424 | 6, 087, 211 |
| Marine-animal oils | gallons | 29, 965, 452 | 6, 385, 309 |
| Miscellaneous byproducts | | | 1, 267, 068 |
| Total | | | 22, 598, 037 |
| Grand total | | | 102, 619, 379 |

[1] "Cut-out" or "drained" weights of can contents are included for whole and minced clams, and gross can contents for other clam products.
[2] Exclusive of duplication.

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con.

VALUE OF PRODUCTION: BY STATES

| State | Canned products | Byproducts | Total |
|---|---|---|---|
| Maine | $4,251,142 | $323,328 | $4,574,470 |
| Massachusetts | 1,092,131 | 1,602,779 | 2,709,402 |
| Rhode Island | | 14,492 | |
| Connecticut | | 772,001 | 772,001 |
| New York | 512,059 | 1,412,372 | 1,924,431 |
| New Jersey | 1,344,023 | 1,451,167 | 3,234,400 |
| Pennsylvania | | 439,210 | |
| Delaware | | 303,208 | 303,208 |
| Maryland | 266,478 | 596,191 | 862,669 |
| Virginia | 39,264 | 1,026,565 | 1,065,829 |
| North Carolina and South Carolina | 474,542 | 406,322 | 1,395,940 |
| Georgia | 515,076 | | |
| Florida | 412,617 | 756,665 | 1,169,282 |
| Alabama and Mississippi | 1,804,816 | 80,770 | 1,885,586 |
| Louisiana | 2,409,369 | 451,852 | 2,861,221 |
| Texas and Wisconsin | 465,989 | 99,056 | 565,045 |
| Missouri, Illinois, Kansas, and Indiana | | 78,817 | 78,817 |
| Iowa | | 2,993,355 | 2,993,355 |
| Washington | 6,026,551 | 162,546 | 6,189,097 |
| Oregon | 3,015,285 | 35,804 | 3,051,089 |
| California | 19,405,810 | 8,235,322 | 27,641,132 |
| Alaska | 37,986,190 | 1,356,215 | 39,342,405 |
| Total | 80,021,342 | 22,598,037 | 102,619,379 |

PACK OF CANNED SALMON: STANDARD CASES

| Product | Alaska | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Southeast | | Central | | Western | | Total | |
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| Chinook or king; | | | | | | | | |
| 1-pound tall | 6,704 | $37,288 | 20,623 | $113,795 | 5,339 | $30,952 | 32,666 | $182,035 |
| 1-pound flat | 4,633 | 34,426 | 3,609 | 33,695 | 1,972 | 12,226 | 10,214 | 80,347 |
| ½-pound flat | 4,257 | 42,719 | 4,240 | 43,717 | 1,486 | 13,081 | 9,983 | 99,517 |
| Total | 15,594 | 114,433 | 28,472 | 191,207 | 8,797 | 56,259 | 52,863 | 361,899 |
| Blueback, red or sockeye: | | | | | | | | |
| 1-pound tall | 70,298 | 459,108 | 588,365 | 3,852,068 | 1,807,872 | 11,925,575 | 2,466,535 | 16,236,751 |
| 1-pound flat | 11,904 | 92,854 | 58,589 | 428,947 | 2,937 | 22,338 | 73,430 | 544,139 |
| ½-pound flat | 22,196 | 220,224 | 62,516 | 615,161 | 3,339 | 32,379 | 88,051 | 867,764 |
| Total | 104,398 | 772,186 | 709,470 | 4,896,176 | 1,814,148 | 11,980,292 | 2,628,016 | 17,648,654 |
| Silver or coho: | | | | | | | | |
| 1-pound tall | 146,634 | 755,434 | 74,196 | 379,374 | 1,219 | 6,273 | 222,049 | 1,141,081 |
| 1-pound flat | 6,826 | 38,958 | 1,457 | 7,701 | | | 8,283 | 46,659 |
| ½-pound flat | 5,067 | 40,540 | 718 | 5,470 | | | 5,785 | 46,010 |
| Total | 158,527 | 834,932 | 76,371 | 392,545 | 1,219 | 6,273 | 236,117 | 1,233,750 |
| Humpback or pink: | | | | | | | | |
| 1-pound tall | 2,593,066 | 10,633,959 | 1,198,707 | 4,826,930 | 1,959 | 8,132 | 3,793,732 | 15,469,021 |
| 1-pound flat | 1,621 | 7,134 | 47 | 188 | | | 1,668 | 7,322 |
| ½-pound flat | 27,675 | 182,478 | 1,118 | 6,981 | | | 28,793 | 189,459 |
| Total | 2,622,362 | 10,823,571 | 1,199,872 | 4,834,099 | 1,959 | 8,132 | 3,824,193 | 15,665,802 |
| Chum or keta: | | | | | | | | |
| 1-pound tall | 391,975 | 1,422,980 | 313,172 | 1,138,195 | 33,196 | 127,383 | 738,343 | 2,688,558 |
| ½-pound flat | 2,237 | 12,941 | 61 | 346 | | | 2,298 | 13,287 |
| Total | 394,212 | 1,435,921 | 313,233 | 1,138,541 | 33,196 | 127,383 | 740,641 | 2,701,845 |
| Grand total | 3,295,093 | 13,981,043 | 2,327,418 | 11,452,568 | 1,859,319 | 12,178,339 | 7,481,830 | 37,611,950 |

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con

PACK OF CANNED SALMON: STANDARD CASES—Continued

| Product | United States | | | | | | Grand total, Alaska and United States | |
|---|---|---|---|---|---|---|---|---|
| | Washington | | Oregon | | Total | | | |
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| Chinook or king: | | | | | | | | |
| 1-pound tall | 14,605 | $80,945 | 33,612 | $142,710 | 48,217 | $223,655 | 80,883 | $405,690 |
| 1-pound oval | 174 | 3,654 | 383 | 8,043 | 557 | 11,697 | 557 | 11,697 |
| 1-pound flat | 15,338 | 132,310 | 39,761 | 339,169 | 55,099 | 471,479 | 65,313 | 551,826 |
| ½-pound oval | | | 1,411 | 36,686 | 1,411 | 36,686 | 1,411 | 36,686 |
| ½-pound flat | 43,990 | 549,222 | 109,383 | 1,333,195 | 153,373 | 1,882,417 | 163,356 | 1,981,934 |
| ¼-pound flat | | | 12,344 | 178,619 | 12,344 | 178,619 | 12,344 | 178,619 |
| Total | 74,107 | 766,131 | 196,894 | 2,038,422 | 271,001 | 2,804,553 | 323,864 | 3,166,452 |
| Blueback, red or sockeye: | | | | | | | | |
| 1-pound tall | 87,153 | 606,585 | | | 87,153 | 606,585 | 2,553,688 | 16,843,336 |
| 1-pound flat | 61,095 | 535,192 | | | 61,095 | 535,192 | 134,525 | 1,079,331 |
| ½-pound flat | 205,923 | 2,473,000 | 3,603 | 51,883 | 209,526 | 2,524,883 | 297,577 | 3,392,647 |
| ¼-pound flat | 998 | 15,968 | 1,539 | 28,318 | 2,537 | 44,286 | 2,537 | 44,286 |
| Total | 355,169 | 3,630,745 | 5,142 | 80,201 | 360,311 | 3,710,946 | 2,988,327 | 21,359,600 |
| Silver or coho: | | | | | | | | |
| 1-pound tall | 14,350 | 73,767 | 2,642 | 13,210 | 16,992 | 86,977 | 239,041 | 1,228,058 |
| 1-pound flat | 17,847 | 107,082 | 8,726 | 52,320 | 26,567 | 159,402 | 34,850 | 206,061 |
| ½-pound oval | | | 274 | 3,836 | 274 | 3,836 | 274 | 3,836 |
| ½-pound flat | 37,197 | 302,610 | 26,299 | 210,392 | 63,496 | 513,002 | 69,281 | 559,012 |
| ¼-pound flat | 2,473 | 25,719 | 25,764 | 280,828 | 28,237 | 306,547 | 28,237 | 306,547 |
| Total | 71,867 | 509,178 | 63,699 | 560,586 | 135,566 | 1,069,764 | 371,683 | 2,303,514 |
| Humpback or pink: | | | | | | | | |
| 1-pound tall | 1,130 | 4,520 | | | 1,130 | 4,520 | 3,794,862 | 15,473,541 |
| 1-pound flat | 97 | 427 | | | 97 | 427 | 1,765 | 7,749 |
| ½-pound flat | 2,346 | 14,545 | | | 2,346 | 14,545 | 31,139 | 204,004 |
| Total | 3,573 | 19,492 | | | 3,573 | 19,492 | 3,827,766 | 15,685,294 |
| Chum or keta: | | | | | | | | |
| 1-pound tall | 75,075 | 271,315 | 24,302 | 87,187 | 99,377 | 358,502 | 837,720 | 3,047,060 |
| 1-pound flat | 43 | 172 | 470 | 1,880 | 513 | 2,052 | 513 | 2,052 |
| ½-pound flat | 13,132 | 76,210 | 1,651 | 10,732 | 14,783 | 86,942 | 17,081 | 100,229 |
| Total | 88,250 | 347,697 | 26,423 | 99,799 | 114,673 | 447,496 | 855,314 | 3,149,341 |
| Steelhead: | | | | | | | | |
| 1-pound tall | | | 1,185 | 4,740 | 1,185 | 4,740 | 1,185 | 4,740 |
| 1-pound flat | 2,796 | 17,335 | 855 | 5,301 | 3,651 | 22,636 | 3,651 | 22,636 |
| ½-pound oval | | | 3,128 | 45,043 | 3,128 | 45,043 | 3,128 | 45,043 |
| ½-pound flat | 318 | 2,544 | 4,088 | 32,704 | 4,406 | 35,248 | 4,406 | 35,248 |
| ¼-pound flat | | | 3,712 | 46,029 | 3,712 | 46,029 | 3,712 | 46,029 |
| Total | 3,114 | 19,879 | 12,968 | 133,817 | 16,082 | 153,696 | 16,082 | 153,696 |
| Grand total | 596,080 | 5,293,122 | 305,126 | 2,912,825 | 901,206 | 8,205,947 | 8,383,036 | 45,817,897 |

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 1-pound cans to the case. Salmon were canned at 32 plants in Washington, 10 in Oregon, and 110 in Alaska.

PACK OF CANNED SARDINES

| Sardines (herring) | Maine | | Sardines (pilchard) | California | |
|---|---|---|---|---|---|
| | *Cases* | *Value* | | *Cases* | *Value* |
| Quarters, ¼-pound (100 cans): | | | 1-pound oval (48 cans): | | |
| In cottonseed oil | [4] 984,058 | [4] $2,864,464 | In cottonseed oil | 2,891 | $7,598 |
| In mustard | 90,985 | 285,315 | In mustard | 276,426 | 732,243 |
| In other sauces or oils | 7,252 | 42,622 | In tomato sauce | 1,312,263 | 3,562,719 |
| Three-quarters, ¾-pound (48 cans): | | | In natural oil | 25,793 | 66,835 |
| In mustard | 41,969 | 122,789 | In other sauces or oils | 13,382 | 47,700 |
| | | | ½-pound oval (48 cans): | | |
| | | | In various sauces or oils | 15,417 | 40,147 |
| | | | 1-pound tall (48 cans): | | |
| | | | In natural oil | 164,271 | 369,394 |
| | | | In other sauces or oils | 12,231 | 27,519 |
| | | | 5-ounce Eastern oyster (100 cans): | | |
| | | | In natural oil | 165,418 | 424,664 |
| | | | In other sauces or oils | 68,098 | 183,798 |
| | | | Other sizes: | | |
| | | | In various sauces or oils (standard cases) | 3,063 | 18,774 |
| Total | 1,124,264 | 3,315,190 | Total | 2,059,253 | 5,481,391 |
| Total (standard cases) | 1,142,730 | | Total (standard cases) | 1,970,047 | |

[4] Includes a small amount packed in 6-ounce cans, 100 to the case, which has been converted to the basis of 4-ounce cans, 100 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the uniform basis of one hundred ¼-pound cans to the case of sardines (herring), and forty-eight 1-pound cans to the case of sardines (pilchard). Sardines were canned at 22 plants in Maine and 20 in California.

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con

PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA

| Size | Albacore | | Yellowfin | | Bluefin | | Striped | |
|---|---|---|---|---|---|---|---|---|
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| ¼-pound (48 cans) | 1, 872 | $7, 358 | 132, 582 | $472, 318 | 26, 488 | $86, 299 | [5] 24, 722 | [5] $78, 869 |
| ¼-pound (100 cans) | | | | | | | | |
| ½-pound (48 cans) | 66, 857 | 390, 900 | 759, 334 | 3, 987, 914 | 259, 324 | 1, 171, 559 | 183, 750 | 833, 989 |
| 1-pound (48 cans) | [5] 7, 140 | [5] 77, 477 | [6] 75, 128 | [6] 717, 451 | [6] 13, 630 | [6] 112, 681 | 11, 445 | 93, 212 |
| Flakes (standard cases) | 8, 526 | 36, 584 | [7] 121, 891 | [7] 502, 820 | 12, 369 | 50, 194 | [7] 7, 358 | [7] 28, 729 |
| Total | 84, 395 | 512, 319 | 1, 091, 935 | 5, 680, 503 | 311, 811 | 1, 420, 733 | 227, 275 | 1, 034, 799 |
| Total (standard cases) | 90, 599 | | 1, 100, 772 | | 312, 198 | | 226, 359 | |

| Size | "Tonno" | | Bonito | | Yellowtail | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| ¼-pound (48 cans) | | | 184 | $557 | | | 185, 848 | $645, 401 |
| ¼-pound (100 cans) | 145, 585 | $981, 493 | 2, 875 | 18, 104 | | | 148, 460 | 999, 597 |
| ½-pound (48 cans) | 15, 843 | 100, 825 | 43, 190 | 174, 076 | 8, 464 | $33, 852 | 1, 336, 762 | 6, 693, 115 |
| 1-pound (48 cans) | | | 5, 903 | 41, 861 | 1, 492 | 10, 420 | 114, 738 | 1. 053, 102 |
| Flakes (standard cases) | | | | | | | 153, 144 | 618, 327 |
| Total | 161. 428 | 1, 082, 318 | 52, 152 | 234, 598 | 9, 956 | 44, 272 | 1, 938, 952 | 10, 009, 542 |
| Total (standard cases) | 167, 484 | | 58, 083 | | 11, 448 | | 1, 966, 943 | |

[5] Includes the pack in ¼-pound cans, 100 to the case, which has been converted to the equivalent of ¼-pound cans, 48 to the case.

[6] Includes the pack in 4-pound cans, 12 to the case, which has been converted to the equivalent of 1-pound cans, 48 to the case.

[7] Includes the pack of creamed tuna flakes, in ¾-pound cans, 48 to the case, which has been converted to the equivalent of ½-pound cans, 48 to the case.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight ½-pound cans to the case. Tuna and tunalike fishes were canned at 13 plants in California.

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: STANDARD CASES

| Product | Maryland | | Virginia and North Carolina | | Total | |
|---|---|---|---|---|---|---|
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| Alewives | 17, 951 | $52, 585 | [8] 548 | [8] $1, 459 | 18, 499 | $54, 044 |
| Alewife roe | 5, 525 | 29, 917 | 13, 607 | 53, 414 | 19, 132 | 83, 331 |
| Total | 23, 476 | 82, 502 | 14, 155 | 54, 873 | 37, 631 | 137, 375 |

[8] This entire pack was canned in Virginia.

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: ACTUAL CASES

| Product and size | Cases | Value |
|---|---|---|
| Alewives: | | |
| 16-ounce (48 cans) | 15, 052 | $44, 651 |
| 10-ounce (48 cans) and 17- and 19-ounce (24 cans) | 5, 959 | 9, 393 |
| Total | | 54, 044 |
| Alewife roe: | | |
| 8-ounce (48 cans) | 7, 039 | 19, 729 |
| 7½- and 10-ounce (48 cans) | 1, 519 | 2, 660 |
| 10-, 16-, and 19-ounce (24 cans) | 6, 447 | 13, 668 |
| 17-ounce (24 cans) | 22, 644 | 47, 274 |
| Total | | 83, 331 |
| Grand total | | 137, 375 |

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 1-pound cans to the case. Alewives or alewife roe were canned at 7 plants in Maryland, 15 in Virginia, and 3 in North Carolina.

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con.

PACK OF CANNED OYSTERS: STANDARD CASES

| State | Cases | Value | State | Cases | Value |
|---|---|---|---|---|---|
| New Jersey, Maryland, Georgia, and Alabama | 19,323 | $80,717 | Louisiana | 49,133 | $201,793 |
| South Carolina | 91,752 | 392,551 | Washington and Oregon | 69,497 | 322,637 |
| Florida | 12,980 | 51,331 | Total | 438,542 | 1,871,060 |
| Mississippi | 195,857 | 822,031 | | | |

PACK OF CANNED OYSTERS: ACTUAL CASES

| Size | Cases | Value | Size | Cases | Value |
|---|---|---|---|---|---|
| 4-ounce (48 cans) | 32,746 | $125,976 | 8-ounce (48 cans) | 23,680 | $170,248 |
| 5-ounce (48 cans) | 324,444 | 1,360,080 | 10-ounce (24 cans) | 36,356 | 151,276 |
| 6-ounce (48 cans) | 2,627 | 12,694 | | | |
| 8-ounce (24 cans) | 13,131 | 50,786 | Total | -------- | 1,871,060 |

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of forty-eight 5-ounce cans to the case. Oysters were canned at 1 plant in New Jersey, 1 in Maryland, 4 in South Carolina, 1 in Georgia, 3 in Florida, 2 in Alabama, 16 in Mississippi, 8 in Louisiana, 9 in Washington, and 1 in Oregon.

PACK OF CANNED CLAMS AND CLAM PRODUCTS

| Item and State | Cases | Value | Item and State | Cases | Value |
|---|---|---|---|---|---|
| Razor clams (Washington, Oregon, and Alaska): | | | Hard clams—Continued. | | |
| Whole: | | | Juice: | | |
| ½-pound, 4-ounce (48 cans) | 76 | $912 | No. 1, 10-ounce (48 cans) | 1,705 | $9,551 |
| No. 1, 5-ounce (48 cans) | 612 | 5,234 | No. 10, 102-ounce (6 cans) | 2,170 | 6,835 |
| 1-pound, 8-ounce (48 cans) | 294 | 3,848 | Other sizes (standard cases) | 4,141 | 21,519 |
| Minced: | | | Cocktail; | | |
| ½-pound, 4-ounce (48 cans) | 54,492 | 348,664 | All sizes (standard cases) | 1,486 | 10,385 |
| No. 1, 5-ounce (48 cans) | 4,984 | 33,953 | Broth and nectar: | | |
| 1-pound, 8-ounce (48 cans) | 81 | 624 | All sizes (standard cases) | 4,703 | 24,911 |
| No. 2, 10-ounce (24 cans) | 452 | 3,592 | Total | 398,432 | 1,689,234 |
| Juice: | | | | | |
| All sizes (standard cases) | 126 | 378 | Total (standard cases) | 397,924 | -------- |
| Total | 61,117 | 397,205 | Soft clams (Maine and Massachusetts): | | |
| Total (standard cases) | 50,429 | -------- | Whole: | | |
| Hard clams (Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Florida, Washington, and Alaska)[9] | | | No. 1, 5-ounce (48 cans) | 62,837 | 230,727 |
| Whole: | | | 1 pound, 8-ounce (48 cans) | 7,573 | 39,968 |
| No. 1, 5-ounce (48 cans) | 2,064 | 16,130 | No. 2, 10-ounce (24 cans) | 14,570 | 49,214 |
| 1-pound, 8-ounce (48 cans) | 2,108 | 14,348 | Other sizes (standard cases) | 347 | 1,490 |
| No. 2, 10-ounce (24 cans) | 4,608 | 27,347 | Chowder: | | |
| No. 10, 52-ounce (6 cans) | 5,344 | 25,662 | No. 1, 10-ounce (48 cans) | 30,257 | 106,726 |
| Other sizes (standard cases) | 913 | 6,058 | 17-ounce (24 cans) | 18,066 | 67,105 |
| Minced: | | | No. 10, 102-ounce (6 cans) | 1,450 | 6,268 |
| ½-pound, 4-ounce (48 cans) | 8,799 | 27,640 | Other sizes (standard cases) | 34,565 | 89,321 |
| No. 1, 5-ounce (48 cans) | 1,769 | 8,511 | Bouillon and juice: | | |
| No. 10, 52-ounce (6 cans) | 3,027 | 26,553 | All sizes (standard cases) | 12,804 | 35,970 |
| Other sizes (standard cases) | 2,520 | 15,301 | Total | 182,469 | 626,789 |
| Chowder: | | | | | |
| No. 1, 10-ounce (48 cans) | 144,409 | 549,277 | Total (standard cases) | 184,702 | -------- |
| 33-ounce (12 cans) | 20,094 | 59,745 | | | |
| No. 10, 102-ounce (6 cans) | 1,441 | 13,971 | Grand total (standard cases) | 633,055 | 2,713,228 |
| Other sizes (standard cases) | 187,131 | 825,490 | | | |

[9] Includes a small amount of coquina broth packed in Florida.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48 No. 1, 5-ounce cans to the case for whole and minced clams; and 48 No. 1, 10-ounce cans to the case for other clam products. Razor clams were canned at 8 plants in Washington, 4 in Oregon, and 9 in Alaska; hard clam products at 1 plant in Massachusetts, 1 in Rhode Island, 2 in New York, 2 in New Jersey, 1 in Pennsylvania, 2 in Maryland, 3 in Florida, 6 in Washington, and 1 in Alaska; soft clam products, at 20 plants in Maine, and 1 in Massachusetts; and coquina clam products, at 1 plant in Florida.

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con.

PACK OF CANNED SHRIMP: STANDARD CASES

| State | Dry pack (in tins) | | Wet pack (in tins) | | Wet pack (in glass) | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| South Carolina, Alabama, and Texas | 56,687 | $231,295 | 123,699 | $497,087 | (10) | (10) | 180,386 | $728,382 |
| Georgia | 19,771 | 87,000 | 54,351 | 228,896 | [10]46,296 | [10]$310,721 | 120,418 | 626,617 |
| Florida | 1,195 | 5,463 | 33,160 | 142,400 | 14,212 | 87,025 | 48,567 | 234,888 |
| Mississippi | 47,203 | 196,640 | 113,916 | 474,873 | | | 161,119 | 671,513 |
| Louisiana | 165,175 | 714,387 | 346,131 | 1,427,011 | (10) | (10) | 511,306 | 2,141,398 |
| Alaska | | | | | 26 | 279 | 26 | 279 |
| Total | 290,031 | 1,234,785 | 671,257 | 2,770,267 | 60,534 | 398,025 | 1,021,822 | 4,403,077 |

PACK OF CANNED SHRIMP: ACTUAL CASES

| Size | Cases | Value | Size | Cases | Value |
|---|---|---|---|---|---|
| In tins, dry: | | | In glass, wet: | | |
| 4-ounce (48 cans) | 8,035 | $28,786 | 4-ounce (24 jars) | 7,013 | $22,054 |
| 5-ounce (48 cans) | 267,140 | 1,116,643 | 5¾-ounce (24 jars) | 29,515 | 94,976 |
| 8¼-ounce (24 cans) | 19,429 | 87,139 | 6-ounce (24 jars) | 77,034 | 270,069 |
| Other sizes (standard cases) | 434 | 2,217 | Other sizes (standard cases) | 3,150 | 10,926 |
| In tins, wet: | | | | | |
| 5¾-ounce (48 cans) | 664,635 | 2,737,798 | Total | | 4,403,077 |
| 9¾-ounce (24 cans) | 7,157 | 29,603 | | | |
| Other sizes (standard cases) | 554 | 2,866 | | | |

[10] The pack of shrimp in glass for Louisiana and Texas has been included with that of Georgia to avoid disclosure of private enterprise.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48, 5-ounce cans to the case in dry pack and 48, 5¾-ounce cans to the case in the wet pack. Shrimp were canned at 1 plant in South Carolina, 6 in Georgia, 5 in Florida, 2 in Alabama, 15 in Mississippi, 20 in Louisiana, 2 in Texas, and 1 in Alaska.

PACK OF MISCELLANEOUS CANNED FISHERY PRODUCTS: STANDARD CASES

| Product | Atlantic and Gulf coasts [11] | | Pacific coast (including Alaska) | | Total | |
|---|---|---|---|---|---|---|
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| Mackerel | 24,868 | $157,140 | 1,250,551 | $3,087,804 | 1,275,419 | $3,244,944 |
| Shad | | | 8,233 | 24,458 | 8,223 | 24,458 |
| Shad roe | | | 2,118 | 58,857 | 2,118 | 58,857 |
| Fish flakes [12] | 36,540 | 326,372 | | | 36,540 | 326,372 |
| Cat and dog food | 13,756 | 27,850 | 287,752 | 795,590 | 301,508 | 823,440 |
| Fish cakes, balls, etc. | 77,595 | 609,889 | | | 77,595 | 609,889 |
| Miscellaneous fish [13] | 2,949 | 25,135 | 1,417 | 6,810 | 4,366 | 31,945 |
| Sturgeon caviar | [14] 3,128 | [14] 397,036 | (14) | (14) | 3,128 | 397,036 |
| Whitefish roe and caviar | 912 | 37,678 | | | 912 | 37,678 |
| Salmon eggs for bait | | | 5,044 | 128,453 | 5,044 | 128,453 |
| Miscellaneous roe and caviar [15] | 16,518 | 116,173 | | | 16,518 | 116,173 |
| Crabs | (16) | (16) | [16] 11,614 | [16] 191,532 | 11,614 | 191,532 |
| Terrapin products | 52 | 4,606 | | | 52 | 4,606 |
| Turtle products | 3,152 | 53,626 | | | 3,152 | 53,626 |
| Miscellaneous shellfish, etc. [17] | 36,983 | 212,924 | 1,914 | 10,649 | 38,897 | 223,573 |
| Total | 216,453 | 1,968,429 | 1,568,643 | 4,304,153 | 1,785,096 | 6,272,582 |

[11] Includes 1 firm producing whitefish caviar in Wisconsin.
[12] Tuna flakes are not included in this table, but are included in the table for canned tuna and tunalike fishes.
[13] Includes finnan haddie, smoked king salmon, Dolly Varden trout, gefilte fish, bait herring, pickled eels, fish chowder, tuna cocktail, and fish prepared for poisoning rats.
[14] The production of one firm in Washington is included with the Atlantic and Gulf coasts.
[15] Includes salmon roe and caviar and ground-fish roe.
[16] The production of 1 firm in Virginia is included with the Pacific coast.
[17] Includes pickled mussels, squid, oyster purée, and conch and frog products.

NOTE.—"Standard cases" represent the various sized cases converted to the equivalent of 48, 1-pound cans to the case.

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con.

PRODUCTION OF OYSTER-SHELL PRODUCTS [18]

| State | Crushed oyster-shell for poultry feed | | Oyster-shell lime | | Total | |
|---|---|---|---|---|---|---|
| | *Tons* | *Value* | *Tons* | *Value* | *Tons* | *Value* |
| Rhode Island and Delaware | 1,151 | $9,988 | 324 | $1,349 | 1,475 | $11,337 |
| New Jersey | 4,951 | 41,104 | 2,083 | 8,986 | 7,034 | 50,090 |
| Pennsylvania | 2,978 | 26,192 | 1,169 | 4,208 | 4,147 | 30,400 |
| Maryland | 35,602 | 178,443 | 21,346 | 35,483 | 56,948 | 213,926 |
| Virginia | 10,689 | 57,235 | [19] 18,653 | [19] 78,296 | 29,342 | 135,531 |
| North Carolina and South Carolina | 3,841 | 26,667 | [20] 1,550 | [20] 5,975 | 5,391 | 32,642 |
| Florida | 54,477 | 264,403 | ([21]) | ([20]) | 54,477 | 264,403 |
| Alabama, Louisiana, and Texas | 104,616 | 512,318 | 8,197 | 27,538 | 112,813 | 539,856 |
| Mississippi | 14,029 | 67,745 | ([21]) | ([21]) | 14,029 | 67,745 |
| Washington | 3,595 | 33,618 | | | 3,595 | 33,618 |
| Oregon and California | 16,315 | 86,389 | [21] 1,055 | [21] 2,999 | 17,370 | 89,388 |
| Total | 252,244 | 1,304,102 | 54,377 | 164,834 | 306,621 | 1,468,936 |

[18] The production in Washington was from both crushed clam shells and oyster shells.
[19] Of this amount 9,027 tons valued at $50,135 were reported as "burned" lime.
[20] The production of oyster-shell lime in Florida has been included with that of North Carolina and South Carolina.
[21] The production of oyster-shell lime in Mississippi has been included with that of Oregon and California.

NOTE.—The above crushed-shell products were prepared at 2 plants in Rhode Island, 9 in New Jersey, 4 in Pennsylvania, 1 in Delaware, 5 in Maryland, 8 in Virginia, 4 in North Carolina, 2 in South Carolina, 3 in Florida, 2 in Alabama, 4 in Mississippi, 1 in Louisiana, 3 in Texas, 6 in Washington, 1 in Oregon, and 5 in California.

PRODUCTION OF FRESH-WATER MUSSEL-SHELL PRODUCTS

| Item | Iowa | | New York | | Other States | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Pearl buttons ... gross | 11,422,475 | $2,849,520 | 3,438,542 | $855,579 | 392,800 | $80,300 | 15,253,817 | $3,785,399 |
| Crushed shell for poultry feed ... tons | 6,340 | 37,514 | | | 540 | 3,417 | 6,880 | 40,931 |
| Lime ... do | 1,600 | 3,925 | 113 | 277 | 225 | 225 | 1,938 | 4,427 |
| Other products [22] | | 102,396 | | | | 40,000 | | 142,396 |
| Total | | 2,993,355 | | 855,856 | | 123,942 | | 3,973,153 |

[22] Includes stucco, colored shells, and "pearl novelties."

NOTE.—Mussel shells utilized in the above production amounted to 49,456,000 pounds, valued at $646,687. Shells were taken in 18 States in the Mississippi River Valley and Great Lakes region. The producing States in order of their importance were Arkansas, which contributed 22 percent of the total quantity; Illinois, 20 percent; Indiana, 14 percent; Tennessee, 12 percent; Michigan and Kentucky, each 6 percent; Iowa, Wisconsin, and Ohio, each 4 percent; Minnesota, 3 percent; Texas, 2 percent; Alabama, Mississippi, and Missouri, each 1 percent; and Kansas, Oklahoma, Louisiana, and South Dakota, each less than ½ of 1 percent.

PRODUCTION OF MARINE PEARL-SHELL PRODUCTS [23]

| Item | Maine, Massachusetts, Rhode Island, and Connecticut | | New York | | New Jersey | |
|---|---|---|---|---|---|---|
| | *Gross* | *Value* | *Gross* | *Value* | *Gross* | *Value* |
| Pearl buttons | 1,481,853 | $824,762 | 512,531 | $391,109 | 1,267,703 | $955,660 |
| Novelties [24] | | 242,618 | | 44,066 | | 130,619 |
| Total | | 1,067,380 | | 435,175 | | 1,086,279 |

| Item | Pennsylvania, Maryland, and Florida | | Oregon and California | | Total | |
|---|---|---|---|---|---|---|
| | *Gross* | *Value* | *Gross* | *Value* | *Gross* | *Value* |
| Pearl buttons | 1,377,089 | $708,810 | | | 4,639,176 | $2,880,341 |
| Novelties [24] | | 73,400 | | $45,316 | | 536,019 |
| Total | | 782,210 | | 45,316 | | 3,416,360 |

[23] Produced principally from imported shells.
[24] Includes buckles, inlays for jewelry, knife handles, lamps, handles of manicure sets, etc.

NOTE.—Marine pearl-shell products were manufactured at 1 plant in Maine, 2 in Massachusetts, 1 in Rhode Island, 6 in Connecticut, 10 in New York, 20 in New Jersey, 2 in Pennsylvania, 1 in Maryland, 3 in Florida, 2 in Oregon, and 2 in California.

*Canned fishery products and byproducts of the United States and Alaska, 1934*—Con.

FISH UTILIZED AND PRODUCTS OF THE MENHADEN INDUSTRY

| State | Menhaden utilized | Products | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Dry scrap and meal | | Acidulated scrap | | Oil | | Total |
| | *Number* | *Tons* | *Value* | *Tons* | *Value* | *Gallons* | *Value* | *Value* |
| New York, New Jersey, Delaware, and Georgia | 241,912,000 | 7,672 | $255,940 | 12,116 | $209,764 | 1,396,190 | $283,828 | $749,532 |
| Virginia | 251,732,000 | 17,645 | 565,354 | 1,027 | 15,777 | 1,253,924 | 248,401 | 829,532 |
| North Carolina | 100,582,000 | 4,210 | 144,097 | 4,768 | 85,800 | 407,000 | 72,960 | 302,857 |
| Florida | 178,018,000 | 8,408 | 282,306 | 4,140 | 70,218 | 555,250 | 100,468 | 452,992 |
| Total | [25]772,244,000 | [26] 37,935 | [26]1,247,697 | 22,051 | 381,559 | 3,612,364 | 705,657 | 2,334,913 |

[25] 463,346,000 pounds.
[26] Of this production, 32,450 tons, valued at $1,040,745, were reported as dry scrap, and 5,485 tons valued at $206,952 as fish meal.

NOTE.—The menhaden factories were located as follows: 1 in New York, 2 in New Jersey, 2 in Delaware, 10 in Virginia, 7 in North Carolina, 1 in Georgia, and 4 in Florida.

PRODUCTION OF MISCELLANEOUS BYPRODUCTS

| Product | Atlantic and Gulf coasts [27] | | Pacific coast (including Alaska) | | Total | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Dried scrap: | | | | | | |
| Alewife ... tons | 520 | $16,508 | | | 520 | $16,508 |
| Herring ... do | 1,297 | 38,122 | | | 1,297 | 38,122 |
| Blue crab ... do | 1,183 | 19,485 | | | 1,183 | 19,485 |
| King crab ... do | 370 | 14,530 | | | 370 | 14,530 |
| Miscellaneous [28] ... do | 1,609 | 37,134 | | | 1,609 | 37,134 |
| Meal: | | | | | | |
| Ground fish "white fish" ... do | 10,272 | 485,124 | | | 10,272 | 485,124 |
| Herring (Alaska) ... do | | | 13,955 | $442,217 | 13,955 | 442,217 |
| Herring (Maine) ... do | 1,224 | 34,741 | | | 1,224 | 34,741 |
| Mackerel ... do | | | 3,323 | 98,392 | 3,323 | 98,392 |
| Pilchard ... do | | | 89,280 | 2,878,269 | 89,280 | 2,878,269 |
| Salmon ... do | | | 1,737 | 46,468 | 1,737 | 46,468 |
| Tuna ... do | | | 6,705 | 191,015 | 6,705 | 191,015 |
| Crab, blue and king ... do | 568 | 8,322 | | | 568 | 8,322 |
| Shrimp ... do | 1,234 | 21,752 | 149 | 2,980 | 1,383 | 24,732 |
| Whale, meat ... do | | | 945 | 27,405 | 945 | 27,405 |
| Whale, bone ... do | | | 404 | 10,100 | 404 | 10,100 |
| Miscellaneous [29] ... do | 801 | 32,090 | 1,862 | 53,301 | 2,663 | 85,391 |
| Oil: | | | | | | |
| Alewife ... gallons | 13,250 | 1,505 | | | 13,250 | 1,505 |
| Cod ... do | 51,132 | 22,149 | | | 51,132 | 22,149 |
| Cod liver ... do | 94,312 | 56,643 | | | 94,312 | 56,643 |
| Herring (Alaska) ... do | | | 3,710,348 | 634,059 | 3,710,348 | 634,059 |
| Herring (Maine) ... do | 61,751 | 7,780 | | | 61,751 | 7,780 |
| Mackerel ... do | | | 157,571 | 25,533 | 157,571 | 25,533 |
| Pilchard ... do | | | 20,845,171 | 4,413,609 | 20,845,171 | 4,413,609 |
| Salmon ... do | | | 202,458 | 57,306 | 202,458 | 57,306 |
| Whale: | | | | | | |
| Sperm ... do | | | 79,000 | 17,530 | 79,000 | 17,530 |
| Other ... do | | | 1,060,950 | 246,670 | 1,060,950 | 246,670 |
| Miscellaneous [30] ... do | 8,226 | 101,987 | 68,919 | 94,881 | 77,145 | 196,868 |
| Liquid glue ... do | [31] 398,860 | [31] 804,688 | ([31]) | ([31]) | 398,860 | 804,688 |
| Pearl essence ... pounds | 13,805 | 103,475 | | | 13,805 | 103,475 |
| Miscellaneous byproducts [32] | | 39,380 | | 319,525 | | 358,905 |
| Total | | 1,845,415 | | 9,559,260 | | 11,404,675 |

[27] Includes the production of burbot liver oil in Wisconsin.
[28] Includes ground-fish and miscellaneous dry scrap, as well as the production of miscellaneous acid scrap by 1 firm in Virginia.
[29] Includes salmon egg, clam, and miscellaneous meal.
[30] Includes tuna, shark, and miscellaneous oil.
[31] A quantity of liquid glue produced by 1 firm in California is included with the production of liquid glue of the Atlantic and Gulf coasts.
[32] Includes isinglass, shark skins, and fins, kelp products, and miscellaneous novelties.

NOTE.—The oils produced on the Pacific coast are reported in trade gallons (7½ pounds) and those produced on the Atlantic and Gulf coasts are reported in United States gallons (about 7.74 pounds).

## FROZEN FISH TRADE [4]

### FISH FROZEN

During 1934 the freezing plants which reported their activities to the Government, froze 133,493,952 pounds of fishery products. These products, at the time they were held in cold-storage plants, were estimated to be valued at about $12,000,000. Compared with the output in 1933 this was an increase of 39 percent. Five species or groups of species accounted for 62 percent of the total amount frozen. In order of their importance they were: Cod, haddock (including haddock fillets), hake, and pollock, which accounted for 19 percent of the total; halibut, 12 percent; salmon and mackerel, each, 11 percent; and whiting, 9 percent. Of the products frozen in considerable quantities during the year were included sea herring, shellfish, butterfish, and croaker.

*Production of frozen fishery products, 1934*

BY SPECIES AND MONTHS

| Species | Month ended the 15th of— | | | | | | |
|---|---|---|---|---|---|---|---|
| | January | February | March | April | May | June | July |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Bluefish (all trade sizes) | 27,161 | 4,480 | 3,136 | 1,083 | 20,679 | 58,706 | 61,605 |
| Butterfish (all trade sizes) | 5,711 | 4,572 | 6,259 | 36 | 13,882 | 671,421 | 1,098,917 |
| Catfish | 26,609 | 13,313 | 8,272 | 37,082 | 110,750 | 114,022 | 63,058 |
| Cisco (Lake Erie) | ---------- | ---------- | ---------- | ---------- | 403 | 6,322 | 7,529 |
| Cisco (lake herring), including bluefin, blackfin, and chub | 23,281 | 38,319 | 4,804 | 983 | 3,394 | 25,236 | 111,266 |
| Cisco (tullibees, Canadian lakes) | 33,026 | 2,262 | 2,961 | 4,612 | ---------- | 6,000 | 31,767 |
| Cod, haddock, hake, and pollock | 160,286 | 128,590 | 107,283 | 797,340 | 628,482 | 504,516 | 850,251 |
| Croaker | 4,672 | 6,429 | 3,752 | 5,429 | 561,872 | 39,661 | 284,473 |
| Flounders | 16,231 | 44,742 | 15,000 | 17,490 | 155,407 | 238,109 | 194,356 |
| Haddock fillets | 618,594 | 606,120 | 704,580 | 1,828,521 | 2,037,425 | 2,634,211 | 1,981,256 |
| Halibut (all trade sizes) | ---------- | ---------- | 165,798 | 2,401,449 | 2,448,821 | 3,081,236 | 2,963,820 |
| Herring, sea (including alewives and bluebacks) | 17,388 | 14,878 | 223,584 | 270,178 | 235,462 | 1,657,740 | 1,218,797 |
| Lake trout | 17,638 | 11,591 | 3,690 | 327 | 57,206 | 189,459 | 156,544 |
| Mackerel (except Spanish) | 60,915 | 85,951 | 64,433 | 21,122 | 711,637 | 1,957,503 | 1,950,639 |
| Pike, blue and sauger | 18,412 | 1,632 | 90 | 22 | 159,671 | 382,907 | 64,997 |
| Pike, yellow or wall-eyed | 12,904 | 22,392 | 8,874 | ---------- | 72,053 | 48,914 | 7,620 |
| Pike (including pickerel, jacks, and yellow jack) | 4,288 | 2,219 | 1,232 | 9,042 | 21,807 | 23,772 | 11,294 |
| Sablefish (black cod) | 12,641 | 22,704 | 21,912 | 14,386 | 46,609 | 31,497 | 51,583 |
| Salmon, chinook or king | 18,342 | ---------- | 11,515 | 1,070 | 17,183 | 500,502 | 402,485 |
| Salmon, silver or coho | 25,270 | 29,520 | 61,644 | 2,105 | 11,401 | 67,176 | 391,459 |
| Salmon, fall and pink | 103,207 | 233,800 | 38,041 | 900 | 7,529 | 2,417 | 1,244 |
| Salmon, steelhead trout | 20,245 | 10,441 | 39,209 | 5,825 | 3,469 | 9,015 | 202,903 |
| Salmon, red or sockeye | 71,087 | 219,970 | 70,741 | 17,292 | 17,119 | 19,539 | 41,448 |
| Scup (porgies) | 2,391 | ---------- | 100 | ---------- | 13,722 | 60,521 | 158,312 |
| Shad and shad roe | 22,568 | 8,983 | 10,779 | 687 | 51,217 | 79,956 | 300,283 |
| Shellfish | 157,234 | 210,158 | 219,769 | 150,508 | 613,800 | 889,348 | 292,744 |
| Smelts, eulachon, etc | 146,061 | 141,875 | 174,564 | 418,595 | 87,456 | 26,714 | 33,910 |
| Squid | 5,015 | ---------- | ---------- | 6,410 | 113,001 | 748,713 | 188,820 |
| Sturgeon and spoonbill cat | 2,705 | 3,640 | 838 | 314 | 68,752 | 33,904 | 17,365 |
| Suckers | 6,595 | 4,288 | 7,311 | ---------- | 7,372 | 12,231 | 1,436 |
| Swordfish | (1) | (1) | (1) | (1) | (1) | (1) | 20,627 |
| Weakfish (including southern "sea trout") | 34,637 | 2,901 | 2,088 | ---------- | 45,074 | 140,517 | 221,711 |
| Whitefish | 28,754 | 99,163 | 22,393 | 31,562 | 55,576 | 32,338 | 81,637 |
| Whiting | 37,839 | 222,989 | 136,919 | 72,885 | 202,942 | 2,428,310 | 5,195,602 |
| Miscellaneous fish | 665,741 | 511,711 | 545,115 | 795,077 | 1,832,794 | 1,519,059 | 1,420,871 |
| Total | 2,408,148 | 2,739,633 | 2,677,686 | 6,912,332 | 10,433,967 | 18,241,492 | 20,082,629 |

[1] Prior to July 15, 1934, swordfish were included with "Miscellaneous fish."

[4] The statistics in this section have been furnished by the Bureau of Agricultural Economics, Department of Agriculture.

*Production of frozen fishery products, 1934*—Continued

BY SPECIES AND MONTHS—Continued

| Species | Month ended the 15th of— | | | | | |
|---|---|---|---|---|---|---|
| | August | September | October | November | December | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Bluefish (all trade sizes) | 39,872 | 237,729 | 290,311 | 119,760 | 20,063 | 875,585 |
| Butterfish (all trade sizes) | 82,830 | 76,072 | 37,847 | 312,808 | 78,864 | 2,389,219 |
| Catfish | 26,688 | 31,885 | 9,170 | 22,614 | 40,465 | 503,928 |
| Cisco (Lake Erie) | 3,089 | 1,008 | 556 | 29,366 | 47,267 | 95,540 |
| Cisco (lake herring), including bluefin, blackfin, and chub | 160,358 | 145,008 | 113,434 | 289,757 | 770,347 | 1,686,187 |
| Cisco (tullibees, Canadian lakes) | 7,500 | 6,839 | 5,582 | ------- | 3,949 | 104,528 |
| Cod, haddock, hake, and pollock | 539,449 | 469,591 | 727,158 | 906,741 | 2,648,486 | 8,468,173 |
| Croaker | 851,721 | 233,998 | 65,155 | 19,792 | 49,805 | 2,126,759 |
| Flounders | 51,726 | 24,086 | 45,907 | 80,539 | 134,080 | 1,018,373 |
| Haddock fillets | 1,874,151 | 2,082,872 | 1,553,296 | 427,821 | 1,162,263 | 17,511,110 |
| Halibut (all trade sizes) | 2,280,711 | 1,177,260 | 632,398 | 962,922 | 195,508 | 16,309,923 |
| Herring, sea (including alewives and bluebacks) | 475,231 | 435,847 | 289,303 | 442,353 | 384,668 | 5,665,429 |
| Lake trout | 75,864 | 69,572 | 170,502 | 395,384 | 167,313 | 1,315,090 |
| Mackerel (except Spanish) | 1,932,496 | 5,298,252 | 1,902,257 | 222,743 | 39,769 | 14,247,717 |
| Pike, blue and sauger | 24,929 | 28,715 | 40,242 | 326,911 | 312,859 | 1,361,387 |
| Pike, yellow or wall-eyed | 4,881 | 33,232 | 23,818 | 30,058 | 6,950 | 271,696 |
| Pike (including pickerel, jacks, and yellow jack) | 5,572 | 23,490 | 10,928 | 23,555 | 8,622 | 145,821 |
| Sablefish (black cod) | 64,424 | 170,797 | 744,055 | 581,647 | 34,634 | 1,796,889 |
| Salmon, chinook or king | 728,309 | 949,647 | 865,899 | 196,372 | 16,790 | 3,699,114 |
| Salmon, silver or coho | 1,811,881 | 2,846,711 | 1,280,917 | 646,093 | 83,177 | 7,257,354 |
| Salmon, fall and pink | 27,839 | 152,740 | 497,993 | 1,854,681 | 52,239 | 2,972,630 |
| Salmon, steelhead trout | 268,172 | 113,312 | 20,989 | 26,829 | 4,422 | 715,831 |
| Salmon, red or sockeye | 18,909 | 24,398 | 26,636 | 36,753 | 27,126 | 591,018 |
| Scup (porgies) | 130,794 | 55,671 | 3,937 | 5,963 | 102 | 431,513 |
| Shad and shad roe | 22,053 | 22,219 | 2,194 | 16,337 | 12,226 | 549,502 |
| Shellfish | 490,456 | 432,134 | 532,944 | 798,523 | 449,302 | 5,266,920 |
| Smelts, eulachon, etc | 40,744 | 67,890 | 55,724 | 100,282 | 19,544 | 1,313,359 |
| Squid | 223,414 | 34,862 | 115,408 | 35,145 | 7,413 | 1,478,201 |
| Sturgeon and spoonbill cat | 28,625 | 24,716 | 23,066 | 13,353 | 6,533 | 223,811 |
| Suckers | 5,921 | 209 | 4,047 | 13,332 | 1,390 | 64,132 |
| Swordfish | 176,931 | 185,360 | 37,500 | 106,211 | 9,543 | 536,172 |
| Weakfish (including southern "sea trout") | 279,459 | 131,835 | 227,322 | 189,896 | 18,160 | 1,284,600 |
| Whitefish | 152,380 | 35,235 | 230,576 | 158,651 | 79,054 | 1,007,319 |
| Whiting | 2,186,953 | 768,234 | 272,652 | 116,609 | 127,970 | 11,769,304 |
| Miscellaneous fish | 2,297,916 | 2,103,460 | 1,866,600 | 2,552,645 | 2,328,829 | 18,439,818 |
| Total | 17,383,248 | 18,485,916 | 12,726,323 | 12,052,846 | 9,349,732 | 133,493,952 |

BY GEOGRAPHICAL SECTIONS AND SPECIES [2]

[Expressed in thousands of pounds; that is, 000 omitted]

| Species | New England | Middle Atlantic | South Atlantic | North Central, East | North Central, West | South Central | Pacific | Total |
|---|---|---|---|---|---|---|---|---|
| Bluefish (all trade sizes) | 59 | 739 | 1 | 37 | ------- | 40 | ------- | 876 |
| Butterfish (all trade sizes) | 462 | 1,895 | 16 | 10 | 6 | ------- | ------- | 2,389 |
| Catfish | 158 | 3 | 8 | 45 | 218 | 72 | ------- | 504 |
| Cisco (Lake Erie) | ------- | 96 | ------- | ------- | ------- | ------- | ------- | 96 |
| Cisco (lake herring), including bluefin, blackfin, and chub | ------- | 248 | ------- | 1,170 | 268 | ------- | ------- | 1,686 |
| Cisco (tullibees, Canadian lakes) | 33 | 54 | ------- | 12 | 6 | ------- | ------- | 105 |
| Cod, haddock, hake, and pollock | 7,068 | 453 | 3 | 287 | 94 | 355 | 208 | 8,468 |
| Croaker | ------- | 498 | 1,553 | 64 | ------- | 12 | ------- | 2,127 |
| Flounders | 422 | 545 | ------- | 6 | 14 | 3 | 28 | 1,018 |
| Haddock fillets | 16,590 | 58 | 31 | 755 | 69 | ------- | 8 | 17,511 |
| Halibut (all trade sizes) | 139 | 275 | 20 | 796 | 57 | 56 | 14,967 | 16,310 |
| Herring, sea (including alewives and bluebacks) | 4,081 | 265 | 28 | 509 | 12 | 17 | 753 | 5,665 |
| Lake trout | 3 | 243 | 19 | 929 | 120 | 1 | ------- | 1,315 |

[2] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania: South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; and Pacific—Washington, Oregon, California, and Alaska.

*Production of frozen fishery products, 1934*—Continued

BY GEOGRAPHICAL SECTIONS AND SPECIES—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Species | New England | Middle Atlantic | South Atlantic | North Central, East | North Central, West | South Central | Pacific | Total |
|---|---|---|---|---|---|---|---|---|
| Mackerel (except Spanish) | 12,138 | 1,766 | 24 | 134 | 19 | 19 | 148 | 14,248 |
| Pike, blue and sauger | | 930 | | 431 | | | | 1,361 |
| Pike, yellow or wall-eyed | | 98 | | 140 | 33 | 1 | | 272 |
| Pike (including pickerel, jacks, and yellow jack) | | 24 | | 34 | 88 | | | 146 |
| Sablefish (black cod) | | 9 | | 42 | 12 | | 1,734 | 1,797 |
| Salmon, chinook or king | 41 | 63 | | 18 | 31 | | 3,546 | 3,699 |
| Salmon, silver or coho | 27 | 141 | | 30 | 39 | | 7,020 | 7,257 |
| Salmon, fall and pink | 1 | 34 | | 13 | 23 | | 2,902 | 2,973 |
| Salmon, steelhead trout | | 50 | 6 | 5 | | | 655 | 716 |
| Salmon, red or sockeye | | 23 | | 36 | 17 | 5 | 510 | 591 |
| Scup (porgies) | 50 | 382 | | | | | | 432 |
| Shad and shad roe | 343 | 111 | | 37 | | 2 | 56 | 549 |
| Shellfish | 638 | 1,832 | 153 | 934 | 650 | 32 | 1,028 | 5,267 |
| Smelts, eulachon, etc | 61 | 543 | 3 | 427 | 5 | 3 | 271 | 1,313 |
| Squid | 1,230 | 201 | | 1 | | | 46 | 1,478 |
| Sturgeon and spoonbill cat | | 134 | | 13 | 46 | 17 | 14 | 224 |
| Suckers | | 1 | | 50 | | 13 | | 64 |
| Swordfish [1] | 404 | 1 | | 1 | | | 130 | 536 |
| Weakfish (including southern "sea trout") | 1 | 1,148 | 136 | | | | | 1,285 |
| Whitefish | 16 | 700 | 1 | 256 | 30 | 3 | 1 | 1,007 |
| Whiting | 10,155 | 1,085 | 27 | 95 | 292 | 115 | | 11,769 |
| Miscellaneous fish | 4,340 | 1,715 | 1,737 | 4,702 | 1,021 | 1,898 | 3,027 | 18,440 |
| Total | 58,460 | 16,363 | 3,766 | 12,019 | 3,170 | 2,664 | 37,052 | 133,494 |

[1] Prior to July 15, 1934, swordfish were included with "Miscellaneous fish."

BY GEOGRAPHICAL SECTIONS AND MONTHS

[Expressed in thousands of pounds; that is, 000 omitted]

| Month ended the 15th of— | New England | Middle Atlantic | South Atlantic | North Central, East | North Central, West | South Central | Pacific | Total |
|---|---|---|---|---|---|---|---|---|
| January | 759 | 544 | 197 | 372 | 95 | 109 | 332 | 2,408 |
| February | 631 | 407 | 56 | 348 | 310 | 181 | 807 | 2,740 |
| March | 711 | 394 | 3 | 396 | 259 | 258 | 657 | 2,678 |
| April | 2,969 | 119 | 12 | 695 | 110 | 137 | 2,870 | 6,912 |
| May | 3,505 | 1,550 | 856 | 947 | 295 | 157 | 3,124 | 10,434 |
| June | 9,358 | 2,571 | 155 | 1,614 | 465 | 225 | 3,853 | 18,241 |
| July | 12,053 | 2,443 | 355 | 729 | 164 | 303 | 4,036 | 20,083 |
| August | 7,795 | 1,616 | 1,399 | 972 | 129 | 190 | 5,282 | 17,383 |
| September | 9,351 | 1,437 | 372 | 1,110 | 164 | 251 | 5,801 | 18,486 |
| October | 4,824 | 1,784 | 103 | 1,142 | 182 | 361 | 4,330 | 12,726 |
| November | 2,132 | 2,421 | 123 | 1,678 | 387 | 277 | 5,035 | 12,053 |
| December | 4,372 | 1,077 | 135 | 2,016 | 610 | 215 | 925 | 9,350 |
| Total | 58,460 | 16,363 | 3,766 | 12,019 | 3,170 | 2,664 | 37,052 | 133,494 |

## HOLDINGS

During 1934 monthly holdings of frozen fish and shellfish averaged 48,492,000 pounds, which is an increase of 23 percent as compared with the average monthly holdings in 1933. The holdings during October were largest, amounting to 77,151,000 pounds. However, the holdings during each of the months from September to December exceeded 70,000,000 pounds. The holdings during April were smallest when only 15,839,000 pounds of frozen fishery products were in storage.

*Holdings of frozen fishery products, 1934*

BY SPECIES AND MONTHS

| Species | Month ended the 15th of— | | | | | |
|---|---|---|---|---|---|---|
| | January | February | March | April | May | June |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Bluefish (all trade sizes) | 396,305 | 216,788 | 130,340 | 81,857 | 77,326 | 115,052 |
| Butterfish (all trade sizes) | 818,482 | 564,374 | 367,760 | 189,967 | 120,872 | 773,730 |
| Catfish | 228,046 | 148,812 | 29,512 | 61,432 | 150,840 | 253,081 |
| Cisco (Lake Erie) | 64,986 | 81,187 | 79,531 | 15,498 | 6,591 | 10,787 |
| Cisco (lake herring), including bluefin, blackfin, and chub | 1,672,758 | 1,286,452 | 773,027 | 464,083 | 220,135 | 220,395 |
| Cisco (tullibees, Canadian lakes) | 308,660 | 270,244 | 211,054 | 155,548 | 74,325 | 57,607 |
| Cod, haddock, hake, and pollock | 1,239,513 | 569,689 | 270,013 | 743,744 | 1,014,406 | 1,050,923 |
| Croaker | 359,624 | 153,233 | 82,646 | 14,044 | 586,696 | 642,315 |
| Flounders | 179,844 | 109,580 | 44,266 | 66,070 | 205,005 | 431,700 |
| Haddock fillets | 3,969,905 | 2,498,276 | 842,528 | 1,485,712 | 2,345,797 | 4,003,329 |
| Halibut (all trade sizes) | 5,274,682 | 3,670,527 | 1,316,381 | 3,166,601 | 5,356,692 | 8,268,695 |
| Herring, sea (including alewives and bluebacks) | 1,476,051 | 1,058,571 | 750,075 | 652,215 | 759,208 | 2,005,918 |
| Lake trout | 525,685 | 309,617 | 119,065 | 21,638 | 61,438 | 253,229 |
| Mackerel (except Spanish) | 5,109,252 | 3,105,029 | 1,641,387 | 391,909 | 724,908 | 2,551,375 |
| Pike, blue and sauger | 620,071 | 527,809 | 357,586 | 63,236 | 188,478 | 466,963 |
| Pike, yellow or wall-eyed | 284,360 | 330,087 | 182,111 | 30,327 | 94,624 | 137,875 |
| Pike (including pickerel, jacks, and yellow jack) | 113,467 | 133,130 | 76,902 | 43,165 | 49,140 | 70,055 |
| Sablefish (black cod) | 599,477 | 427,515 | 211,539 | 142,904 | 122,868 | 123,954 |
| Salmon, chinook or king | 1,285,970 | 824,410 | 492,180 | 365,159 | 282,645 | 690,480 |
| Salmon, silver or coho | 2,792,142 | 2,019,708 | 1,095,756 | 512,573 | 380,110 | 335,193 |
| Salmon, fall and pink | 1,942,287 | 1,574,257 | 768,515 | 420,331 | 289,664 | 210,165 |
| Salmon, steelhead trout | 90,853 | 73,236 | 91,245 | 40,829 | 26,820 | 31,042 |
| Salmon, red or sockeye | 322,576 | 340,751 | 190,101 | 85,240 | 91,908 | 84,964 |
| Scup (porgies) | 99,684 | 57,535 | 29,935 | 12,330 | 17,070 | 66,291 |
| Shad and shad roe | 422,968 | 342,601 | 220,277 | 172,416 | 194,882 | 254,410 |
| Shellfish | 1,405,491 | 1,495,595 | 897,941 | 647,734 | 958,859 | 1,715,913 |
| Smelts, eulachon, etc | 197,488 | 195,987 | 278,360 | 715,978 | 759,972 | 728,419 |
| Squid | 303,583 | 316,229 | 145,598 | 19,257 | 120,060 | 1,058,728 |
| Sturgeon and spoonbill cat | 314,920 | 291,663 | 241,678 | 228,001 | 231,858 | 217,946 |
| Suckers | 108,457 | 84,067 | 64,253 | 64,325 | 57,579 | 58,833 |
| Swordfish | (1) | (1) | (1) | (1) | (1) | (1) |
| Weakfish (including southern "sea trout") | 423,562 | 169,040 | 65,979 | 13,352 | 53,832 | 181,754 |
| Whitefish | 2,310,132 | 1,939,230 | 1,782,456 | 1,350,699 | 856,904 | 669,451 |
| Whiting | 4,001,716 | 3,195,417 | 1,743,144 | 955,491 | 584,700 | 2,625,704 |
| Miscellaneous fish | 5,397,092 | 4,141,934 | 2,920,166 | 2,445,812 | 3,486,461 | 4,307,418 |
| Total | 44,660,089 | 32,522,580 | 18,513,307 | 15,839,477 | 20,552,673 | 34,673,694 |

| Species | Month ended the 15th of— | | | | | |
|---|---|---|---|---|---|---|
| | July | August | September | October | November | December |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Bluefish (all trade sizes) | 140,448 | 136,854 | 354,900 | 597,722 | 625,946 | 545,159 |
| Butterfish (all trade sizes) | 1,749,139 | 1,681,421 | 1,657,817 | 1,539,856 | 1,692,903 | 1,525,528 |
| Catfish | 261,462 | 245,094 | 137,694 | 103,510 | 92,757 | 132,455 |
| Cisco (Lake Erie) | 16,711 | 12,395 | 40,510 | 36,847 | 64,184 | 95,855 |
| Cisco (lake herring), including bluefin, blackfin, and chub | 291,624 | 379,590 | 415,797 | 396,849 | 693,534 | 1,265,551 |
| Cisco (tullibees, Canadian lakes) | 57,059 | 54,592 | 55,908 | 48,407 | 103,904 | 99,679 |
| Cod, haddock, hake, and pollock | 1,727,992 | 2,184,510 | 2,107,851 | 1,882,282 | 2,184,578 | 4,085,788 |
| Croaker | 914,255 | 1,778,993 | 2,031,389 | 1,891,546 | 1,742,526 | 1,683,081 |
| Flounders | 584,414 | 561,934 | 502,499 | 500,415 | 455,600 | 529,149 |
| Haddock fillets | 5,597,808 | 6,722,941 | 7,361,420 | 7,455,512 | 5,909,730 | 6,279,045 |
| Halibut (all trade sizes) | 11,114,912 | 13,222,506 | 13,320,852 | 12,400,438 | 11,248,326 | 8,570,018 |
| Herring, sea (including alewives and bluebacks) | 2,773,434 | 2,762,334 | 2,771,868 | 2,735,448 | 2,837,854 | 2,804,759 |
| Lake trout | 432,104 | 487,162 | 550,718 | 692,139 | 1,122,797 | 1,140,365 |
| Mackerel (except Spanish) | 4,372,729 | 5,768,678 | 10,397,860 | 10,811,789 | 9,093,138 | 7,521,288 |
| Pike, blue and sauger | 466,145 | 328,872 | 346,096 | 358,547 | 634,681 | 948,068 |
| Pike, yellow or wall-eyed | 143,939 | 147,177 | 186,143 | 205,690 | 235,031 | 207,216 |
| Pike (including pickerel, jacks, and yellow jack) | 67,647 | 59,433 | 74,472 | 104,676 | 187,444 | 135,199 |
| Sablefish (black cod) | 137,436 | 150,405 | 246,857 | 898,272 | 1,335,467 | 1,172,722 |
| Salmon, chinook or king | 952,369 | 1,503,513 | 2,395,376 | 3,008,740 | 3,063,309 | 2,639,033 |
| Salmon, silver or coho | 677,532 | 2,487,800 | 5,318,894 | 6,522,560 | 6,327,374 | 5,008,229 |
| Salmon, fall and pink | 155,319 | 156,263 | 262,923 | 725,372 | 2,442,579 | 2,153,270 |
| Salmon, steelhead trout | 233,995 | 551,561 | 666,787 | 789,863 | 698,706 | 621,397 |
| Salmon, red or sockeye | 93,517 | 80,956 | 76,129 | 179,729 | 148,165 | 131,961 |
| Scup (porgies) | 220,365 | 338,286 | 386,627 | 378,993 | 358,357 | 293,593 |
| Shad and shad roe | 521,207 | 528,013 | 522,927 | 448,217 | 429,943 | 380,040 |
| Shellfish | 1,726,733 | 1,588,857 | 1,643,845 | 1,921,011 | 2,378,099 | 2,258,407 |
| Smelts, eulachon, etc | 643,794 | 657,122 | 679,385 | 701,844 | 696,604 | 742,506 |

[1] Prior to July 15, 1934, swordfish were included with "Miscellaneous fish."

*Holdings of frozen fishery products, 1934*—Continued

BY SPECIES AND MONTHS—Continued

| Species | Month ended the 15th of— | | | | | |
|---|---|---|---|---|---|---|
| | July | August | September | October | November | December |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Squid | 1,156,956 | 1,142,375 | 995,577 | 1,011,554 | 891,434 | 898,398 |
| Sturgeon and spoonbill cat | 187,298 | 199,293 | 205,369 | 254,096 | 451,766 | 509,050 |
| Suckers | 59,576 | 67,970 | 20,663 | 19,724 | 20,668 | 17,154 |
| Swordfish | 18,013 | 190,344 | 367,688 | 401,987 | 351,616 | 531,888 |
| Weakfish (including southern "sea trout") | 367,007 | 566,275 | 679,894 | 849,950 | 983,096 | 802,303 |
| Whitefish | 705,381 | 961,263 | 1,087,851 | 1,127,398 | 1,118,178 | 969,288 |
| Whiting | 7,421,992 | 8,835,306 | 8,851,058 | 8,417,392 | 7,613,369 | 7,126,793 |
| Miscellaneous fish | 4,786,663 | 6,060,937 | 6,915,639 | 7,732,494 | 8,892,235 | 10,025,865 |
| Total | 50,776,975 | 62,601,025 | 73,637,283 | 77,150,809 | 77,125,898 | 73,850,100 |

BY GEOGRAPHICAL SECTIONS AND MONTHS [2]

[Expressed in thousands of pounds; that is, 000 omitted]

| Month ended the 15th of— | New England | Middle Atlantic | South Atlantic | North Central, East | North Central, West | South Central | Pacific [3] | Total |
|---|---|---|---|---|---|---|---|---|
| January | 14,870 | 9,780 | 1,418 | 5,263 | 2,064 | 412 | 10,853 | 44,660 |
| February | 9,888 | 7,996 | 980 | 4,061 | 1,765 | 308 | 7,525 | 32,523 |
| March | 4,568 | 6,093 | 641 | 2,482 | 1,340 | 346 | 3,043 | 18,513 |
| April | 3,531 | 4,276 | 421 | 1,929 | 1,228 | 205 | 4,249 | 15,839 |
| May | 4,260 | 4,404 | 1,206 | 2,553 | 1,424 | 269 | 6,437 | 20,553 |
| June | 11,413 | 6,166 | 1,375 | 3,864 | 1,614 | 289 | 9,953 | 34,674 |
| July | 21,798 | 7,773 | 1,716 | 4,023 | 1,651 | 409 | 13,407 | 50,777 |
| August | 26,443 | 8,544 | 2,953 | 4,342 | 1,882 | 395 | 18,042 | 62,601 |
| September | 30,736 | 9,494 | 3,348 | 5,771 | 1,858 | 406 | 22,024 | 73,637 |
| October | 29,144 | 10,704 | 3,213 | 7,560 | 2,286 | 585 | 23,659 | 77,151 |
| November | 25,551 | 12,341 | 3,113 | 9,014 | 2,603 | 588 | 23,916 | 77,126 |
| December | 25,865 | 12,203 | 3,152 | 9,985 | 3,016 | 611 | 19,018 | 73,850 |
| Average | 17,339 | 8,315 | 1,961 | 5,070 | 1,894 | 402 | 13,511 | 48,492 |

[2] New England includes the 6 States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; and Pacific—Washington, Oregon, California, and Alaska.

[3] Includes a small amount of fish held in Colorado in the Mountain section.

## COLD STORAGE HOLDINGS OF CURED FISH

During 1934 monthly cold storage holdings of cured herring and mild-cured salmon averaged 13,826,000 pounds, which is a decrease of 7 percent as compared with the average monthly holdings in 1933. The holdings during October were largest, amounting to 16,916,880 pounds, and the smallest were in March, amounting to 10,553,839 pounds.

*Holdings of cured fish, 1934, by species and months*

| Month ended the 15th of— | Cured herring | Mild-cured salmon | Total |
|---|---|---|---|
| | *Pounds* | *Pounds* | *Pounds* |
| January | 12,476,109 | 3,715,280 | 16,191,389 |
| February | 10,697,263 | 2,735,627 | 13,432,890 |
| March | 8,621,167 | 1,932,672 | 10,553,839 |
| April | 9,555,517 | 1,934,289 | 11,489,806 |
| May | 10,680,368 | 1,393,382 | 12,073,750 |
| June | 11,217,038 | 1,510,220 | 12,727,258 |
| July | 10,358,795 | 2,283,797 | 12,642,592 |
| August | 9,662,858 | 4,195,014 | 13,857,872 |
| September | 9,555,150 | 5,937,916 | 15,493,066 |
| October | 10,680,436 | 6,236,444 | 16,916,880 |
| November | 9,863,391 | 6,026,180 | 15,889,571 |
| December | 8,957,644 | 5,683,957 | 14,641,601 |

## FOREIGN FISHERY TRADE

The foreign trade in fishery products of the United States in 1934 amounted to $44,611,776, of which $30,789,995 represents the value of these products imported for consumption, and $13,821,781, the value of exports of domestic fishery products. Compared with the previous year, there was an increase of 15 percent in total trade, 1 percent in the value of the imports, and 66 percent in the value of exports.

Imports consisted of 286,763,407 pounds of edible products, valued at $23,174,248, and nonedible products, valued at $7,615,747. Fishery exports consisted of 115,702,334 pounds of edible products, valued at $12,002,686, and nonedible products, valued at $1,819,781.

*Exports of domestic fishery products, 1934*

| Item | | Quantity | Value |
|---|---|---|---|
| EDIBLE FISHERY PRODUCTS | | | |
| Fish, fresh, frozen, or packed in ice: | | | |
| Salmon | pounds | 7,928,249 | $764,906 |
| Other | do | 2,847,861 | 224,519 |
| Total | do | 10,776,110 | 989,425 |
| Fish, salted, smoked, or dry cured: | | | |
| Cod | do | 589,086 | 58,834 |
| Salmon | do | 513,529 | 73,140 |
| Other | do | 1,043,450 | 66,451 |
| Total | do | 2,146,065 | 198,425 |
| Fish, pickled: | | | |
| Salmon | do | 1,550,800 | 296,499 |
| Other | do | 548,000 | 29,660 |
| Total | do | 2,098,800 | 326,159 |
| Fish, canned: | | | |
| Mackerel | do | 4,703,566 | 218,894 |
| Salmon | do | 49,065,899 | 6,676,178 |
| Sardines | do | 33,145,553 | 1,937,431 |
| Other | do | 1,278,380 | 185,250 |
| Total | do | 88,193,398 | 9,017,753 |
| Shellfish, not canned: | | | |
| Oysters, fresh, in the shell | do | 3,293,227 | 108,653 |
| Oysters, fresh, shucked, frozen, or in ice | do | 1,534,971 | 185,072 |
| Shrimp, fresh, frozen, or in ice | do | 1,521,785 | 157,314 |
| Shrimp, dried | do | 1,647,865 | 268,829 |
| Other shellfish, fresh, frozen, in ice, or dried | do | 225,468 | 20,729 |
| Total | do | 8,223,316 | 740,597 |
| Shellfish, canned | do | 4,009,702 | 652,243 |
| Other fish products | do | 254,943 | 78,084 |
| Total edible products | do | 115,702,334 | 12,002,686 |
| NONEDIBLE FISHERY PRODUCTS | | | |
| Marine-animal oils | do | 6,363,891 | 193,955 |
| Sponges | do | 82,661 | 93,143 |
| Fish meal for feed | tons | 27,230 | 1,172,204 |
| Oyster shells | do | 51,205 | 359,793 |
| Total nonedible products | | | 1,819,095 |
| Grand total | | | 13,821,781 |

*Imports of fishery products entered for consumption, 1934*

| Item | Pounds | Value |
|---|---|---|
| EDIBLE FISHERY PRODUCTS | | |
| Fish, fresh or frozen: | | |
| Whole, beheaded, or eviscerated or both: | | |
| Salmon | 5,658,262 | $533,291 |
| Fresh-water fish, not elsewhere specified: | | |
| Yellow pike | 8,348,967 | 653,477 |
| Whitefish | 10,016,034 | 945,164 |
| Tullibees | 1,084,439 | 43,904 |
| Jacks or grass pike | 2,043,208 | 108,749 |
| Lake trout | 2,749,277 | 247,167 |
| Yellow perch | 4,159,563 | 221,193 |
| Lake herring, ciscoes and chubs | 1,160,911 | 120,745 |
| Fresh-water fish, not elsewhere specified | 15,097,097 | 1,024,028 |
| Eels | 487,127 | 22,418 |
| Cod, haddock, hake, pollock, and cusk | 1,941,557 | 84,644 |
| Halibut: | | |
| Fresh | 2,418,997 | 241,663 |
| Frozen | 368,398 | 29,977 |
| Mackerel | 238,880 | 12,677 |
| Swordfish | 2,950,484 | 334,933 |
| Sturgeon | 1,744,458 | 254,351 |
| Fish, not specially provided for | 2,544,321 | 109,980 |
| Whether or not whole: | | |
| Smelts | 5,271,722 | 624,464 |
| Tuna fish | 6,093,459 | 413,476 |
| Sea herring: | | |
| Fresh | 36,117,818 | 229,351 |
| Frozen | 2,079,890 | 60,530 |
| Fillets, skinned, boned, sliced, or divided, not specially provided for | 3,942,094 | 467,749 |
| Total | 116,516,963 | 6,783,931 |
| Fish, salted, dried, smoked, pickled, or preserved: | | |
| Dried and unsalted: | | |
| Cod, haddock, hake, pollock, and cusk | 40,098 | 3,523 |
| Other | 3,666,965 | 398,711 |
| In oil or in oil and other substances: | | |
| Sardines | 22,692,650 | 2,597,447 |
| Anchovies | 1,894,968 | 599,914 |
| Antipasto | 211,972 | 78,613 |
| Tuna | 8,266,196 | 1,277,417 |
| Other | 339,822 | 52,838 |
| Not in oil or in oil and other substances: | | |
| In airtight containers weighing, with contents, not over 15 pounds each: | | |
| Anchovies | 2,246,114 | 232,450 |
| Salmon | 220,465 | 17,983 |
| Herring and sardines | 6,496,360 | 485,447 |
| Fish cakes, balls, and pudding | 1,650,803 | 117,623 |
| Other | 2,048,720 | 239,848 |
| Pickled or salted: | | |
| Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each: | | |
| Salmon | 1,220,561 | 182,235 |
| Cod, haddock, hake, pollock, and cusk, neither skinned nor boned (except that vertebral column may be removed): | | |
| Containing not more than 43 percent moisture by weight | 6,303,454 | 342,219 |
| Containing more than 43 percent moisture by weight | 34,451,703 | 1,368,126 |
| Cod, haddock, hake, pollock and cusk, skinned or boned | 2,381,563 | 188,860 |
| Herring: | | |
| In bulk or in containers weighing, with contents, more than 15 pounds each (net weight) | 31,807,838 | 1,593,158 |
| In containers (not airtight), weighing, with contents, not more than 15 pounds each | 250 | 27 |
| Mackerel: | | |
| In bulk or in containers weighing, with contents, more than 15 pounds each (net weight) | 3,848,037 | 188,901 |
| Pickled or salted, not specially provided for: | | |
| In bulk or in containers weighing, with contents, more than 15 pounds each (net weight) | 1,166,007 | 79,643 |
| In containers (not airtight) weighing, with contents, not more than 15 pounds each | 2,979 | 518 |
| Smoked or kippered: | | |
| Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each: | | |
| Salmon | 4,463 | 1,652 |
| Herring: | | |
| Whole or beheaded | 892,535 | 34,722 |
| Eviscerated, split, skinned, boned or divided | 751,413 | 70,592 |
| Cod, haddock, hake, pollock, and cusk: | | |
| Whole, or beheaded, or eviscerated or both | 717,720 | 67,223 |
| Filleted, skinned, boned, sliced, or divided | 1,110,517 | 118,810 |
| Smoked or kippered, not specially provided for | 28,699 | 1,819 |

*Imports of fishery products entered for consumption, 1934*—Continued

| Item | Pounds | Value |
|---|---|---|
| EDIBLE FISHERY PRODUCTS—continued | | |
| Fish, salted, dried, smoked, pickled, or preserved—Continued. | | |
| Fish paste and fish sauce | 75, 452 | $24, 326 |
| Prepared or preserved, not specially provided for: | | |
| In containers weighing, with contents, not more than 15 pounds each | 66, 283 | 8, 934 |
| In bulk or in containers weighing, with contents, more than 15 pounds each (net weight) | 152, 184 | 11, 770 |
| Total | 134, 756, 791 | 10, 385, 349 |
| Caviar and other fish roe: | | |
| Not boiled, etc.: | | |
| Sturgeon | 267, 521 | 264, 705 |
| Fish roe, not specially provided for | 88, 852 | 12, 694 |
| Boiled, packed in airtight containers | 60, 434 | 6, 173 |
| Total | 416, 807 | 283, 572 |
| Shellfish: | | |
| Crab meat, crab sauce, and crab paste | 7, 382, 142 | 2, 238, 757 |
| Clams, clam juice, or either in combination with other substances, in airtight containers | 1, 401, 757 | 171, 409 |
| Oysters, oyster juice, or either in combination with other substances in airtight containers | 111, 132 | 32, 888 |
| Lobsters (including spiny lobsters and crawfish): | | |
| Not canned | 10, 158, 388 | 1, 894, 931 |
| Canned | 918, 293 | 469, 279 |
| Clams not in airtight containers | 1, 512, 721 | 25, 567 |
| Shrimp and prawn | 893, 599 | 111, 254 |
| Scallops | 867, 576 | 131, 360 |
| Oysters, not in airtight containers | 7, 435, 025 | 223, 884 |
| Shellfish, not specially provided for | 3, 919, 713 | 386, 817 |
| Pastes and sauces of shellfish, not specially provided for | 125, 691 | 14, 403 |
| Crabs | 4, 106 | 432 |
| Turtles | 342, 703 | 20, 415 |
| Total | 35, 072, 846 | 5, 721, 396 |
| Total edible fishery products | 286, 763, 407 | 23, 474, 248 |
| NONEDIBLE FISHERY PRODUCTS | | |
| Marine-animal oils: | *Quantity* | |
| Cod oil ... gallons | 1, 458, 635 | 390, 860 |
| Cod-liver oil ... do | 3, 470, 259 | 2, 190, 985 |
| Eulachon oil ... do | 888 | 444 |
| Halibut-liver oil ... do | 1, 624 | 42, 563 |
| Herring oil ... do | 218, 483 | 33, 092 |
| Seal oil ... do | 34, 260 | 9, 493 |
| Sod oil ... do | 70, 940 | 15, 226 |
| Whale oil: | | |
| Sperm, crude ... do | 505, 025 | 117, 897 |
| Sperm, refined or otherwise processed ... do | 53, 220 | 21, 067 |
| Whale oil, not specially provided for ... do | 2, 107, 078 | 865, 220 |
| Marine-animal oils, not specifically provided for ... do | 124, 896 | 91, 622 |
| Total ... do | 8, 045, 308 | 3, 778, 469 |
| Pearls and imitation pearls: | | |
| Pearls and parts, not strung or set | ---------- | 477, 018 |
| Imitation pearls, half pearls and hollow or filled | ---------- | 14, 934 |
| Imitation pearl beads: | | |
| Hollow or filled | ---------- | 30, 139 |
| Solid iridescent, valued at not more than 10 cents per inch ... inches | 800 | 45 |
| Other solid imitation pearl beads: | | |
| Valued at not more than ¼ cent per inch ... do | 82, 553, 375 | 59, 485 |
| Valued at more than ¼, but not more than 1 cent per inch ... do | 151, 516 | 533 |
| Valued at more than 1 but not more than 5 cents per inch ... do | 19, 768 | 250 |
| Total | ---------- | 582, 404 |
| Shells and buttons of pearl or shell: | | |
| Shells, unmanufactured: | | |
| Green snail shell ... pounds | 289, 286 | 31, 729 |
| Mother-of-pearl ... do | 3, 840, 436 | 875, 698 |
| Shells, not specially provided for ... do | 4, 880, 861 | 64, 775 |
| Shells and mother-of-pearl, engraved, cut, ornamented, or manufactured | ---------- | 53, 407 |
| Shell pearl buttons: | | |
| Ocean or trochus ... gross | 220, 378 | 68, 282 |
| Fresh water ... do | 5, 005 | 1, 289 |
| Buttons (from Philippine Islands) ... do | 637, 555 | 235, 117 |
| Total | ---------- | 1, 330, 297 |

*Imports of fishery products entered for consumption, 1934*—Continued

| Item | | Quantity | Value |
|---|---|---|---|
| NONEDIBLE FISHERY PRODUCTS—continued | | | |
| Sponges: | | | |
| Sheepswool | pounds | 130,980 | $211,164 |
| Yellow, grass, or velvet | do | 285,992 | 88,645 |
| Other | do | 58,776 | 85,988 |
| Manufactures of | do | 3,559 | 1,933 |
| Total | do | 479,307 | 387,730 |
| Agar-agar | do | 465,326 | 156,304 |
| Ambergris | do | 30 | 3,586 |
| Cod-liver oil cake and cod-liver oil cake meal | do | 1,409,412 | 35,412 |
| Cuttlefish bone | do | 308,876 | 47,098 |
| Goldfish, live | number | 524,294 | 5,093 |
| Fish for other than human consumption, not elsewhere specified | | | 119,843 |
| Fish sounds | pounds | 165,413 | 27,096 |
| Fish scrap and fish meal | tons | 35,621 | 996,358 |
| Isinglass | | | 29,961 |
| Kelp | pounds | 6,916 | 124 |
| Skins, fish, raw or salted | do | 726,531 | 36,532 |
| Skins, seal, raw (not fur skins) | do | 490 838 | 61,553 |
| Spermaceti wax | do | 137,438 | 17,103 |
| Whalebone, unmanufactured | do | 466 | 168 |
| Whalebone, manufactures of | | | 616 |
| Total | | | 1,536,847 |
| Total, nonedible fishery products | | | 7,615,747 |
| Grand total | | | 30,789,995 |

## FISHERIES OF THE NEW ENGLAND STATES

### (AREA XXII)[5]

The most recent complete fishery statistics for the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) are those collected for the year 1933. In that year the yield of the commercial fisheries amounted to 499,936,139 pounds, valued at $13,485,550 to the fishermen, representing an increase of 4 percent in volume, but a decrease of 4 percent in value as compared with the catch of the previous year. Detailed statistics of these fisheries for 1933 appear in "Fishery industries of the United States, 1934" Appendix II to the Report of the United States Commissioner of Fisheries, 1935. A summary of these fisheries as well as statistics of the vessel fisheries at the principal New England ports for 1934 and the mackerel fishery of the Atlantic coast for 1934 appear in the following tables.

[5] This is the number given this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area craft whose principal fishing ports are in the area but at times fish elsewhere. Notable examples are the ground fish fishery in area XXI and the mackerel and southern trawl fisheries in areas XXIII and XXIV. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

*Fisheries of the New England States, 1933*

OPERATING UNITS: BY STATES

| Item | Maine | New Hampshire | Massachusetts | Rhode Island | Connecticut | Total |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 443 | | 3,971 | 328 | 307 | 5,049 |
| On boats and shore: | | | | | | |
| Regular | 3,748 | 48 | 2,781 | 371 | 360 | 7,308 |
| Casual | 1,841 | 52 | 1,652 | 677 | 494 | 4,716 |
| Total | 6,032 | 100 | 8,404 | 1,376 | 1,161 | 17,073 |
| Vessels: | | | | | | |
| Steam | | | 13 | 8 | 3 | 24 |
| Net tonnage | | | 2,097 | 201 | 581 | 2,879 |
| Motor | 73 | | 365 | 65 | 67 | 570 |
| Net tonnage | 856 | | 13,995 | 695 | 1,056 | 16,602 |
| Sail | 1 | | | | | 1 |
| Net tonnage | 47 | | | | | 47 |
| Total vessels | 74 | | 378 | 73 | 70 | 595 |
| Total net tonnage | 903 | | 16,092 | 896 | 1,637 | 19,528 |
| Boats: | | | | | | |
| Motor | 2,342 | 34 | 1,478 | 433 | 294 | 4,581 |
| Other | 1,396 | 17 | 1,624 | 506 | 276 | 3,819 |
| Accessory boats | 172 | | 942 | 74 | 39 | 1,227 |
| Apparatus: | | | | | | |
| Purse seines: | | | | | | |
| Mackerel | 25 | | 97 | 2 | | 124 |
| Length, yards | 6,648 | | 45,720 | 420 | | 52,788 |
| Other | 51 | | 2 | 1 | | 54 |
| Length, yards | 7,040 | | 260 | 400 | | 7,700 |
| Haul seines | 31 | 1 | 15 | 20 | 12 | 79 |
| Length, yards | 3,100 | 35 | 1,655 | 2,512 | 1,668 | 8,970 |
| Gill nets: | | | | | | |
| Anchor | 1,736 | 4 | 704 | | 2 | 2,446 |
| Square yards | 556,491 | 2,160 | 280,655 | | 1,680 | 840,986 |
| Drift | 709 | | 4,105 | 44 | 43 | 4,901 |
| Square yards | 230,396 | | 1,530,960 | 17,800 | 12,360 | 1,791,516 |
| Runaround | | | 1 | | | 1 |
| Square yards | | | 1,800 | | | 1,800 |
| Lines: | | | | | | |
| Hand | 5,089 | 116 | 505 | 248 | 405 | 6,363 |
| Hooks | 5,259 | 116 | 671 | 319 | 443 | 6,808 |
| Trawl | 24,134 | 260 | 47,836 | 51 | 800 | 73,081 |
| Hooks | 1,155,574 | 13,000 | 2,380,062 | 24,700 | 35,680 | 3,609,016 |
| Troll | | | 8 | 48 | | 56 |
| Hooks | | | 8 | 48 | | 56 |
| Trot with hooks | 16 | | | 1 | | 17 |
| Hooks | 1,600 | | | 200 | | 1,800 |
| Pound nets | 3 | | 86 | 64 | 9 | 162 |
| Floating traps | 21 | | 17 | 40 | | 78 |
| Weirs | 213 | | 4 | | | 217 |
| Fyke nets | 56 | | 24 | 37 | 4 | 121 |
| Dip nets | 124 | | 130 | | 119 | 373 |
| Bag nets | 112 | 30 | | | | 142 |
| Push nets | | | 50 | | | 50 |
| Pocket nets | 2 | | | | | 2 |
| Otter trawls | 50 | | 366 | 61 | 89 | 566 |
| Yards at mouth | 1,235 | | 21,084 | 1,635 | 2,373 | 26,327 |
| Box traps | 13 | | 3 | | | 16 |
| Pots: | | | | | | |
| Crab | 2,296 | | 1,095 | | | 3,391 |
| Eel | 222 | | 1,565 | 1,698 | 1,289 | 4,774 |
| Lobster | 180,439 | 2,990 | 65,147 | 53,672 | 17,212 | 319,460 |
| Periwinkle and cockle | | | 935 | 1,585 | | 2,520 |
| Harpoons | 43 | | 126 | 36 | 16 | 221 |
| Spears | 26 | | 185 | 13 | 42 | 266 |
| Dredges: | | | | | | |
| Oyster | | | 34 | 30 | 43 | 107 |
| Yards at mouth | | | 44 | 45 | 65 | 154 |
| Scallops | 155 | | 2,038 | 374 | 2 | 2,569 |
| Yards at mouth | 231 | | 1,895 | 324 | 7 | 2,457 |
| Clam | | | 63 | 12 | | 75 |
| Yards at mouth | | | 31 | 9 | | 40 |
| Mussel | | | | 1 | | 1 |
| Yards at mouth | | | | 1 | | 1 |
| Tongs | | | 166 | 543 | 118 | 827 |
| Rakes | | | 654 | 75 | 71 | 800 |
| Forks | | | 945 | 8 | | 953 |
| Hoes | 1,605 | | 260 | 26 | 38 | 1,929 |

*Fisheries of the New England States, 1933*—Continued

CATCH: BY STATES[1]

| Species | Maine | | New Hampshire | | Massachusetts | | Rhode Island | | Connecticut | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 1,703,078 | $6,371 | | | 923,056 | $8,399 | 176,000 | $1,915 | 15,162 | $152 | 2,817,296 | $16,837 |
| Amberjack | | | | | 2,275 | 68 | | | | | 2,275 | 68 |
| Bluefish | 85 | 11 | | | 430,040 | 42,882 | 194,386 | 10,806 | 296,454 | 22,058 | 920,965 | 75,757 |
| Bonito | | | | | 5,222 | 233 | 46,322 | 1,923 | | | 51,544 | 2,156 |
| Butterfish | 99,475 | 5,059 | | | 951,585 | 45,905 | 486,522 | 16,204 | 15,941 | 764 | 1,553,523 | 67,932 |
| Cod | 9,336,894 | 145,484 | 28,602 | $858 | 89,210,361 | 1,688,460 | 908,241 | 16,735 | 147,925 | 4,457 | 99,632,023 | 1,855,994 |
| Crevalle | | | | | | | 2,200 | 81 | | | 2,200 | 81 |
| Croaker | | | | | 2,491,145 | 35,716 | | | 5,738 | 136 | 2,496,883 | 35,852 |
| Cunners | 175 | 5 | | | 152 | 2 | 41,440 | 451 | | | 41,767 | 458 |
| Cusk | 1,583,366 | 18,342 | 17,161 | 343 | 4,509,004 | 53,766 | | | | | 6,109,531 | 72,451 |
| Drum: | | | | | | | | | | | | |
| Black | | | | | 32 | 1 | | | 100 | 1 | 132 | 2 |
| Red | | | | | 1,755 | 32 | | | | | 1,755 | 32 |
| Eels: | | | | | | | | | | | | |
| Common | 102,025 | 8,028 | | | 222,279 | 10,727 | 145,611 | 12,113 | 47,394 | 3,964 | 517,309 | 34,832 |
| Conger | | | | | 38,617 | 733 | 958 | 29 | 1,400 | 120 | 40,975 | 882 |
| Flounders | 1,178,669 | 27,517 | | | 27,187,427 | 878,601 | 3,253,077 | 90,930 | 6,176,038 | 175,968 | 37,795,211 | 1,173,016 |
| Frigate mackerel | | | | | 68,799 | 2,752 | 56,654 | 1,609 | | | 125,453 | 4,361 |
| Grayfish | 316 | 7 | | | 12,512 | 132 | 600 | 12 | | | 13,428 | 151 |
| Haddock | 9,306,555 | 215,744 | 60,063 | 2,703 | 150,680,476 | 3,425,852 | 23,968 | 703 | 35,450 | 1,018 | 160,106,512 | 3,646,020 |
| Hake | 7,084,013 | 66,270 | 168,749 | 2,531 | 8,056,678 | 133,691 | 9,171 | 183 | 1,081 | 20 | 15,319,692 | 202,695 |
| Halibut | 50,011 | 4,776 | | | 2,401,292 | 230,469 | | | 6,063 | 310 | 2,457,366 | 235,555 |
| Herring, sea | 43,774,988 | 160,816 | 2,000 | 20 | 3,572,960 | 38,784 | 737,006 | 11,467 | | | 48,086,954 | 211,087 |
| Herring smelt | | | | | 11,648 | 313 | | | | | 11,648 | 313 |
| Hickory shad | | | | | | | 2,308 | 23 | | | 2,308 | 23 |
| King whiting or "kingfish" | | | | | 38,296 | 1,035 | 1,440 | 53 | 451 | 12 | 40,187 | 1,100 |
| Launce | | | | | 21,000 | 420 | | | | | 21,000 | 420 |
| Mackerel | 4,499,107 | 57,740 | 1,050 | 53 | 35,611,363 | 798,108 | 719,289 | 22,137 | 870 | 27 | 40,831,679 | 878,065 |
| Menhaden | | | | | 334 | 4 | 1,003,510 | 2,535 | 25,250 | 252 | 1,029,094 | 2,791 |
| Mullet | | | | | 10 | 1 | 8,811 | 321 | | | 8,821 | 322 |
| Pigfish | | | | | 3,832 | 73 | | | | | 3,832 | 73 |
| Pollock | 3,006,065 | 23,414 | 11,441 | 114 | 11,991,798 | 140,076 | 17,242 | 451 | | | 15,026,546 | 164,055 |
| Rosefish | 2,063 | 14 | | | 262,255 | 2,827 | | | | | 264,318 | 2,841 |
| Salmon | 24,644 | 6,269 | | | 45 | 9 | | | | | 24,689 | 6,278 |
| Scup or porgy | | | | | 2,133,410 | 50,068 | 2,019,431 | 37,433 | 41,987 | 1,659 | 4,194,828 | 89,160 |
| Sea bass | | | | | 3,923,089 | 117,321 | 48,265 | 2,543 | 27,615 | 1,843 | 3,998,969 | 121,707 |
| Sea robin | | | | | 400 | 8 | 73,785 | 697 | 3,250 | 33 | 77,435 | 738 |
| Shad | 178,901 | 1,834 | | | 62,751 | 1,986 | 10,760 | 1,138 | 133,280 | 10,969 | 385,692 | 15,927 |

[1] Excluding seed oyster fishery. The seed oyster fishery in this section was prosecuted in Rhode Island and Connecticut where 258 fishermen, using 23 vessels, 7 motorboats 90 other boats, 101 dredges, 96 tongs, and 46 rakes, took 74,621 bushels of seed oysters, valued at $29,949, from public beds, and 207,185 bushels, valued at $69,617 from private beds. Of the total number of persons fishing for seed oysters 135 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 78 boats other than motor, 82 tongs, and 46 rakes.

*Fisheries of the New England States, 1933*—Continued

CATCH: BY STATES—Continued

| Species | Maine | | New Hampshire | | Massachusetts | | Rhode Island | | Connecticut | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FISH—continued | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Sharks | 29,923 | $230 | | | 34,148 | $287 | 1,947 | $28 | | | 66,018 | $545 |
| Sheepshead | | | | | 9 | 1 | | | | | 9 | 1 |
| Skates | 7,981 | 115 | | | 37,256 | 479 | 176,410 | 1,328 | 18,550 | $185 | 240,197 | 2,107 |
| Skipper or "billfish" | | | | | 4,110 | 41 | 730 | 14 | | | 4,810 | 55 |
| Smelt | 529,990 | 56,827 | 14,267 | $2,140 | | | 4,250 | 425 | 2,240 | 224 | 550,747 | 59,616 |
| Spot | | | | | 32,743 | 376 | 45 | 1 | 50 | 1 | 32,838 | 378 |
| Squeteagues or "sea trout": | | | | | | | | | | | | |
| Gray | | | | | 286,547 | 8,543 | 63,310 | 4,012 | 19,510 | 1,736 | 369,367 | 14,291 |
| Spotted | | | | | 2,048 | 204 | | | | | 2,048 | 204 |
| Striped bass | | | | | 19,957 | 3,932 | 39,232 | 2,418 | 2,250 | 225 | 61,439 | 6,575 |
| Sturgeon | 2,308 | 224 | | | 5,130 | 639 | 449 | 37 | 44 | 5 | 7,931 | 905 |
| Suckers | 50,518 | 1,502 | | | | | | | 1,000 | 60 | 51,518 | 1,562 |
| Swordfish | 323,939 | 39,381 | | | 2,643,512 | 324,817 | 259,710 | 23,799 | 154,235 | 16,650 | 3,381,396 | 404,647 |
| Tautog | | | | | 173,543 | 6,766 | 267,123 | 7,402 | 43,098 | 1,895 | 483,764 | 16,063 |
| Thimble-eyed mackerel | | | | | | | 77,707 | 1,533 | | | 77,707 | 1,533 |
| Tilefish | | | | | | | | | 207,000 | 10,330 | 207,000 | 10,330 |
| Tomcod | 1,964 | 51 | | | | | 200 | 1 | | | 2,164 | 52 |
| Tuna or "horse mackerel" | 100,532 | 2,069 | | | 256,372 | 14,016 | 44,577 | 1,484 | | | 401,481 | 17,569 |
| White perch | | | | | 48,786 | 7,109 | 861 | 42 | | | 49,647 | 7,151 |
| Whiting | | | | | 8,677,742 | 88,648 | 724,506 | 7,626 | 16,775 | 547 | 9,419,023 | 96,821 |
| Wolffish | 93,647 | 482 | 3,142 | 79 | 2,096,569 | 31,334 | | | 4,100 | 41 | 2,197,458 | 31,936 |
| Yellow perch | 534 | 80 | | | | | | | | | 534 | 80 |
| Total | 83,071,766 | 848,662 | 306,475 | 8,841 | 359,144,370 | 8,196,646 | 11,648,054 | 282,642 | 7,450,301 | 255,662 | 461,620,966 | 9,592,453 |
| SHELLFISH, ETC. | | | | | | | | | | | | |
| Crabs: | | | | | | | | | | | | |
| Hard | 501,666 | 15,126 | | | 5,106,515 | 24,795 | 20,478 | 369 | 400 | 25 | 5,629,059 | 40,315 |
| King | | | | | | | 6,574 | 18 | | | 6,574 | 18 |
| Lobsters | 5,897,685 | 1,000,094 | 216,929 | 48,230 | 1,928,616 | 381,649 | 708,095 | 113,933 | 336,800 | 64,135 | 9,088,125 | 1,608,041 |
| Shrimp | | | | | 41,200 | 2,170 | | | | | 41,200 | 2,170 |
| Periwinkles and cockles | 15,516 | 825 | | | 65,700 | 6,350 | 109,442 | 5,201 | | | 190,658 | 12,376 |
| Clams: | | | | | | | | | | | | |
| Hard, public [2] | 11,594 | 1,054 | | | 1,766,525 | 215,048 | 1,068,891 | 125,047 | 101,605 | 20,735 | 2,948,615 | 361,884 |
| Hard, private [2] | | | | | 2,200 | 400 | 89,045 | 12,249 | | | 91,245 | 12,649 |
| Razor | | | | | 358,400 | 15,874 | | | | | 358,400 | 15,874 |
| Soft, public [3] | 6,548,620 | 224,005 | | | 2,836,090 | 245,469 | 32,384 | 4,214 | 13,683 | 1,953 | 9,430,777 | 475,641 |
| Surf or skimmer | | | | | 59,240 | 3,575 | | | | | 59,240 | 3,575 |
| Mussels, sea | 110,596 | 2,534 | | | 30,000 | 3,000 | 650 | 38 | | | 141,246 | 5,572 |
| Oysters: [4] | | | | | | | | | | | | |
| Market, public, spring | | | | | | | 26,880 | 3,840 | 10,150 | 1,250 | 37,030 | 5,090 |
| Market, public, fall | | | | | | | 38,444 | 5,507 | 11,550 | 1,450 | 49,994 | 6,957 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Market, private, spring | | | | | 75,161 | 25,680 | 1,525,384 | 211,748 | 613,547 | 81,383 | 2,214,092 | 318,811 |
| Market, private, fall | | | | | 105,448 | 34,357 | 1,527,055 | 211,897 | 1,223,661 | 170,261 | 2,856,164 | 416,515 |
| Scallops: | | | | | | | | | | | | |
| Bay | | | | | 500,115 | 180,975 | 63,120 | 12,943 | 57,500 | 10,000 | 620,735 | 203,918 |
| Sea | 1,073,172 | 145,884 | | | 1,029,097 | 115,344 | | | 55,926 | 6,226 | 2,158,195 | 267,454 |
| Squid | 203 | 2 | | | 570,536 | 7,564 | 501,851 | 11,618 | 2,905 | 50 | 1,075,495 | 19,234 |
| Irish moss | | | | | 11,650 | 582 | | | | | 11,650 | 582 |
| Bloodworms | 642,852 | 42,724 | | | 17,759 | 28,000 | | | | | 660,611 | 70,724 |
| Sandworms | 618,567 | 25,980 | | | 21,656 | 19,500 | | | | | 640,223 | 45,480 |
| Sea urchins | 5,845 | 217 | | | | | | | | | 5,845 | 217 |
| Total | 15,426,316 | 1,458,445 | 216,929 | 48,230 | 14,525,908 | 1,510,332 | 5,718,293 | 718,622 | 2,427,727 | 357,468 | 38,315,173 | 3,893,097 |
| Grand total | 98,498,082 | 2,307,107 | 523,404 | 57,071 | 373,670,278 | 9,506,978 | 17,366,347 | 1,001,264 | 9,878,028 | 613,130 | 499,936,139 | 13,485,550 |

[2] Statistics on hard clams used in this table are based on yields of 11 pounds of meats per bushel in Maine, Massachusetts, and Rhode Island, and 10 pounds in Connecticut.
[3] Statistics on soft clams in this table are based on yields of 15 pounds of meats per bushel in Maine and Massachusetts, 16 pounds in Rhode Island, and 14 pounds in Connecticut.
[4] Statistics on oysters used in this table are based on yields of 6.57 pounds of meats per bushel in Massachusetts, 6.96 pounds in Rhode Island, and 6.81 pounds in Connecticut.

NOTE.—Of the total catch in Massachusetts, 10,619,503 pounds of fishery products, valued at $281,810, were taken in the southern winter trawl fishery off southern New Jersey, Maryland, Virginia, and North Carolina. Of the total catch in Connecticut, 111,837 pounds of fishery products, valued at $4,641, were taken in the same fishery. These products consisted principally of croaker, flounders, scup, and sea bass.

*Industries related to the fisheries of the New England States*

OPERATING UNITS, SALARIES, AND WAGES, 1933

| Item | Maine and New Hampshire | Massachusetts | Rhode Island | Connecticut | Total |
|---|---|---|---|---|---|
| Transporting: | | | | | |
| Persons engaged: | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 149 | 43 | 8 | 56 | 256 |
| On boats | 16 | | 38 | | 54 |
| Total | 165 | 43 | 46 | 56 | 310 |
| Vessels: | | | | | |
| Steam | | | | 1 | 1 |
| Net tonnage | | | | 67 | 67 |
| Motor | 74 | 12 | 4 | 14 | 104 |
| Net tonnage | 813 | 338 | 39 | 425 | 1,615 |
| Total vessels | 74 | 12 | 4 | 15 | 105 |
| Total net tonnage | 813 | 338 | 39 | 492 | 1,682 |
| Boats | 11 | | 20 | | 31 |
| Wholesale and manufacturing: | | | | | |
| Establishments | 131 | 165 | 35 | 31 | 362 |
| Persons engaged: | | | | | |
| Proprietors | 112 | 89 | 29 | 36 | 266 |
| Salaried employees | 142 | 587 | 35 | 35 | 799 |
| Wage earners: | | | | | |
| Average for season | 4,383 | 3,012 | 301 | 416 | 8,112 |
| Average for year | 1,298 | 2,336 | 207 | 329 | 4,170 |
| Paid to salaried employees | $253,670 | $1,291,380 | $83,949 | $85,198 | $1,714,197 |
| Paid to wage earners | $765,974 | $2,382,013 | $159,894 | $387,994 | $3,695,875 |
| Total salaries and wages | $1,019,644 | $3,673,393 | $243,843 | $473,192 | $5,410,072 |
| Fishermen manufacturing | 612 | 1,480 | 109 | 22 | 2,223 |

PRODUCTS MANUFACTURED

| Item | Maine | | Massachusetts | | Rhode Island | | Connecticut | |
|---|---|---|---|---|---|---|---|---|
| BY MANUFACTURING ESTABLISHMENTS | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Alewives: Salted, tight pack ... pounds | 567,238 | $9,669 | (1) | (1) | | | | |
| Cod: | | | | | | | | |
| Fresh sticks[2] ... do | 209,283 | 24,374 | | | | | | |
| Fresh fillets[2] ... do | 90,605 | 9,813 | 6,586,030 | $748,166 | | | | |
| Frozen fillets[2] ... do | (1) | (1) | 5,849,679 | 560,527 | | | | |
| Salted: | | | | | | | | |
| Green[3] ... do | 734,166 | 28,885 | 593,764 | 29,648 | | | | |
| Dry ... do | 59,196 | 2,054 | (1) | (1) | | | | |
| Boneless, including absolutely boneless ... pounds | 131,175 | 16,333 | 6,312,775 | 1,189,945 | | | | |
| Smoked fillets ... do | 44,889 | 6,718 | 1,017,034 | 147,241 | | | | |
| Oil, cod[2] ... gallons | 5,150 | 1,482 | 45,982 | 20,667 | | | | |
| Oil, cod liver[2] ... do | 13,995 | 5,419 | 69,264 | 46,292 | | | | |
| Cusk: | | | | | | | | |
| Fresh sticks[2] ... pounds | 327,546 | 36,219 | | | | | | |
| Fresh fillets[2] ... do | 47,200 | 5,029 | 372,833 | 49,218 | | | | |
| Frozen fillets[2] ... do | (1) | (1) | 80,122 | 5,292 | | | | |
| Salted: | | | | | | | | |
| Green[3] ... do | 31,150 | 673 | (1) | (1) | | | | |
| Boneless, including absolutely boneless ... pounds | (1) | (1) | 23,785 | 2,762 | | | | |
| Flounders: | | | | | | | | |
| Fresh fillets[2] ... do | 62,027 | 8,262 | 932,328 | 141,326 | | | | |
| Frozen fillets[2] ... do | (1) | (1) | 442,704 | 62,281 | | | | |
| Haddock: | | | | | | | | |
| Fresh fillets[2] ... do | 121,764 | 20,482 | 15,129,191 | 1,734,320 | | | | |
| Frozen fillets[2] ... do | 20,414 | 1,886 | 19,206,008 | 1,740,253 | | | | |
| Fresh steaks[2] ... do | 61,312 | 11,194 | (1) | (1) | | | | |
| Salted: | | | | | | | | |
| Green[3] ... do | 31,400 | 803 | | | | | | |
| Boneless, including absolutely boneless ... pounds | | | 98,295 | 19,220 | | | | |
| Finnan haddie ... do | 131,400 | 18,960 | 931,754 | 103,793 | (1) | (1) | | |

See footnotes at end of table.

*Industries related to the fisheries of the New England States*—Continued

PRODUCTS MANUFACTURED—Continued

| Item | Maine | | Massachusetts | | Rhode Island | | Connecticut | |
|---|---|---|---|---|---|---|---|---|
| BY MANUFACTURING ESTABLISHMENTS—con. | | | | | | | | |
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Hake: | | | | | | | | |
| Fresh fillets [2] pounds | 147,406 | $13,094 | 887,216 | $89,005 | | | | |
| Frozen fillets [2] do | (1) | (1) | 155,194 | 11,512 | | | | |
| Fresh steaks [2] do | 326,726 | 36,244 | | | | | | |
| Salted: | | | | | | | | |
| Green [3] do | 334,123 | 10,069 | (1) | (1) | | | | |
| Dry do | (1) | (1) | 271,172 | 8,723 | | | | |
| Halibut, frozen, steaks [2] pounds | | | 29,124 | 6,343 | | | | |
| Herring, sea: | | | | | | | | |
| Salted, round do | 560,700 | 11,439 | (1) | (1) | | | | |
| Smoked: | | | | | | | | |
| Bloaters: | | | | | | | | |
| Soft do | 286,662 | 10,954 | 585,332 | 52,782 | | | | |
| Hard do | 259,830 | 6,952 | (1) | (1) | | | | |
| Boneless do | 1,953,365 | 187,020 | | | | | | |
| Lengthwise do | 114,915 | 9,456 | | | | | | |
| Medium scaled pounds | 168,370 | 14,247 | (1) | (1) | | | | |
| Kippered do | (1) | (1) | 169,505 | 17,131 | | | | |
| Canned "sardines" [2] standard cases | 1,142,730 | 3,315,190 | | | | | | |
| Scrap, dry [2] tons | 1,297 | 38,122 | | | | | | |
| Meal [2] do | 1,224 | 34,741 | | | | | | |
| Oil [2] gallons | 61,751 | 7,780 | | | | | | |
| Mackerel: | | | | | | | | |
| Fresh fillets [2] pounds | | | 55,200 | 6,604 | | | | |
| Salted: | | | | | | | | |
| Fillets do | (1) | (1) | 1,767,746 | 133,250 | | | | |
| Split do | 84,420 | 2,711 | 1,285,360 | 91,823 | | | | |
| Canned [2] standard cases | 13,228 | 66,799 | | | | | | |
| Pollock: | | | | | | | | |
| Fresh fillets [2] pounds | | | 1,223,280 | 96,125 | | | | |
| Frozen fillets [2] do | (1) | (1) | 2,968,520 | 184,966 | | | | |
| Salted: | | | | | | | | |
| Green [3] do | 89,055 | 1,824 | (1) | (1) | | | | |
| Dry do | 42,387 | 2,004 | 941,442 | 37,115 | | | | |
| Rosefish, fresh fillets [2] pounds | | | 17,760 | 2,191 | | | | |
| Wolffish: | | | | | | | | |
| Fresh fillets [2] do | | | 55,800 | 6,787 | | | | |
| Frozen fillets [2] do | | | 254,830 | 24,079 | | | | |
| Crab meat, packaged, fresh cooked pounds | 67,441 | 33,571 | 151,087 | 62,979 | (1) | (1) | | |
| Lobster meat, packaged, fresh cooked pounds | | | 79,020 | 86,420 | | | | |
| Clams, hard, fresh shucked gallons | | | | | 2,660 | $4,815 | (1) | (1) |
| Clams, soft: | | | | | | | | |
| Fresh shucked do | | | | | 12,145 | 12,083 | | |
| Canned: | | | | | | | | |
| Whole [2] standard cases | 89,787 | 321,189 | | | | | | |
| Chowder [2] standard cases | 75,088 | 244,252 | | | (1) | (1) | | |
| Juice and bouillon [2] standard cases | 12,804 | 35,970 | | | | | | |
| Marine-shell products, buttons [2] gross | (1) | (1) | | | | | 1,226,731 | $697,001 |
| Pearl essence [2] pounds | 13,305 | 99,975 | | | | | | |
| Oysters, fresh shucked gallons | | | | | 301,942 | 514,470 | 175,313 | 313,445 |
| Unclassified products: | | | | | | | | |
| Packaged, fresh and frozen [2] pounds | [4] 283,626 | [4] 22,674 | [5] 3,530,334 | [5] 335,095 | | | | |
| Salted do | [6] 31,363 | [6] 2,639 | [7] 1,601,189 | [7] 103,216 | | | | |
| Smoked do | [8] 251,757 | [8] 25,587 | [9] 764,708 | [9] 151,769 | (10) | (10) | (10) | (10) |
| Canned: | | | | | | | | |
| Fish cakes, flakes, etc. [2] standard cases | 33,145 | 264,477 | 83,107 | 684,470 | | | | |
| Other [2] do | [11] 554 | [11] 3,265 | [12] 55,164 | [12] 267,777 | (10) | (10) | | |

See footnotes at end of table.

*Industries related to the fisheries of the New England States*—Continued

PRODUCTS MANUFACTURED—Continued

| Item | Maine | | Massachusetts | | Rhode Island | | Connecticut | |
|---|---|---|---|---|---|---|---|---|
| BY MANUFACTURING ESTABLISHMENTS—con. | | | | | | | | |
| Unclassified products—Continued. | | | | | | | | |
| Meal, ground fish [2] tons | | | 10,044 | $476,704 | | | | |
| Miscellaneous [13] | | [14]$135,809 | | [15]1,059,116 | | [16]$161,325 | | [17]$138,213 |
| Total | | 5,166,309 | | 10,596,933 | | 692,693 | | 1,148,659 |
| BY FISHERMEN | | | | | | | | |
| Alewives: | | | | | | | | |
| Corned pounds | | | 80,000 | 4,800 | | | | |
| Salted, tight pack pounds | 263,100 | 439 | 420,000 | 12,600 | | | | |
| Smoked do | 165,085 | 4,848 | 12,000 | 600 | | | | |
| Cod, salted: | | | | | | | | |
| Green [3] do | | | 403,778 | 11,087 | | | | |
| Dry do | 5,860 | 226 | | | | | | |
| Cusk, dry salted do | 620 | 11 | 2,714 | 52 | | | | |
| Haddock, green salted [3] pounds | | | 14,365 | 288 | | | | |
| Hake, green salted [3] do | | | 3,030 | 31 | | | | |
| Hake, dry salted do | 4,090 | 77 | | | | | | |
| Halibut, green salted do | | | 2,115 | 97 | | | | |
| Mackerel, salted, split pounds | 600 | 45 | 25,800 | 817 | | | | |
| Pollock, green salted [3] pounds | | | 90 | 1 | | | | |
| Crabmeat, packaged, fresh cooked pounds | 3,459 | 1,558 | 5,000 | 2,500 | 1,200 | 480 | | |
| Clams, razor, fresh shucked gallons | | | 36,078 | 17,729 | | | | |
| Clams, soft: | | | | | | | | |
| Fresh shucked do | 70,281 | 48,225 | 19,000 | 24,000 | 50 | 75 | 500 | 1,000 |
| Steamed pounds | 161,887 | 11,279 | | | | | | |
| Clams, surf or skimmer, fresh shucked gallons | | | 5,922 | 4,050 | | | | |
| Oysters, fresh shucked gallons | | | | | | | 2,840 | 4,680 |
| Scallops, bay, fresh shucked gallons | | | 55,468 | 197,520 | 7,181 | 29,247 | 900 | 3,600 |
| Scallops, sea, fresh shucked gallons | 27,151 | 56,242 | 114,341 | 115,031 | | | | |
| Total | | 122,950 | | 391,203 | | 29,802 | | 9,280 |
| Grand total | | 5,289,259 | | 10,988,136 | | 722,495 | | 1,157,939 |

[1] This item has been included under "Unclassified products."
[2] Data are for 1934.
[3] This item is usually an intermediate product and, although included in the total, may also be shown in its final stage of processing in this or another State.
[4] Includes frozen fillets of cod, cusk, flounders, hake, mackerel, and pollock.
[5] Includes fresh fillets of whiting; frozen fillets of mackerel, rosefish, salmon, and whiting; fresh steaks of cod, haddock, halibut, pollock, salmon, swordfish, and wolffish; frozen steaks of cod, salmon, swordfish, and wolffish; and frozen sticks of whiting.
[6] Includes dry-salted cusk, haddock, and hake; boneless cusk and hake; salted sea herring and mackerel fillets.
[7] Includes green-salted cusk, hake, and pollock; dry-salted cod, cusk, haddock, and tongues; boneless hake; salted alewives, tight pack; and salted sea herring, round and split.
[8] Includes finnan cod; smoked cusk, haddock, and hake fillets; kippered herring; and spiced sea herring.
[9] Includes smoked alewives, butterfish, carp, flounders, halibut, lake trout, mackerel, salmon, shad, and whitefish; smoked cusk, haddock, and hake fillets; sea herring, hard smoked, bloaters, and medium-scaled; spiced sea herring; and smoked and spiced salmon.
[10] This item is included with miscellaneous.
[11] Includes pickled soft clams; finnan haddie; and cat and dog food.
[12] Includes soft-clam chowder; finnan haddie; cat and dog food; hard-clam chowder; mackerel; deep-sea roe; and rat bait.
[13] Both 1933 and 1934 data are included in these items.
[14] Includes ground-fish meal; clam meal; and marine buttons.
[15] Includes ground-fish dry scrap; liquid glue; halibut liver oil; isinglass; marine-shell buttons and novelties; and mussel-shell novelties.
[16] Includes hard-clam chowder; marine-shell novelties; oyster-shell products; packaged fresh-cooked crab meat; fresh-shucked bay scallops; and finnan haddie.
[17] Includes fresh-shucked hard clams; smoked butterfish, carp, mackerel, paddlefish or spoonbill cat, salmon, and whitefish; and marine-shell novelties.

NOTE.—Unless otherwise indicated the data are for 1933. The total value of manufactured products for the New England States was as follows: By manufacturing establishments, $17,604,594; and by fishermen, $553,235. Some of the above products may have been manufactured from products imported from another State or country: therefore they cannot be correlated directly with the catch within the State.

## VESSEL FISHERIES AT PRINCIPAL NEW ENGLAND PORTS

Due to the importance of the ports of Boston and Gloucester, Mass., and Portland, Maine, as landing points for fishery products, detailed monthly statistics are collected for these landings which are published in the following sections.

### ECONOMIC ASPECT

The landings of fishery products at the three principal New England ports (Boston and Gloucester, Mass., and Portland, Maine), by vessels of 5 net tons capacity or more, during 1934 amounted to 299,915,821 pounds as landed, valued at $7,882,397. Of the total landings, 99 percent consisted of fresh fish and 1 percent salted fish. The landings at Boston accounted for 243,692,588 pounds, valued at $6,731,364, or 82 percent of the total volume; the landings at Gloucester amounted to 40,130,189 pounds, valued at $755,699, or 13 percent of the total; and the landings at Portland amounted to 16,093,044 pounds, valued at $395,334, or 5 percent of the total.

Among the landings of fresh fish, haddock far outranked other species in volume landed, the landings of all sizes in 1934 amounted to 127,763,681 pounds, or 43 percent of the total fresh fish.

*Landings by fishing vessels at the three principal New England ports, 1934*

BOSTON: BY MONTHS

| Species | January | | February | | March | | April | | May | | June | | July | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | | | | | | | |
| Large | 1,803,170 | $80,432 | 3,387,435 | $145,131 | 4,897,495 | $123,398 | 3,999,540 | $66,902 | 2,504,443 | $44,962 | 1,779,005 | $43,513 | 2,207,275 | $44,108 |
| Market | 2,346,750 | 83,103 | 1,984,345 | 81,761 | 5,212,615 | 127,581 | 4,411,920 | 72,496 | 3,038,140 | 55,574 | 3,099,610 | 68,588 | 4,035,267 | 72,930 |
| Scrod | 11,640 | 292 | 2,200 | 46 | 1,100 | 27 | 2,400 | 30 | 3,625 | 79 | 6,450 | 110 | 14,350 | 189 |
| Cod, salted: | | | | | | | | | | | | | | |
| Large | | | | | | | | | | | 25,000 | 846 | 12,500 | 450 |
| Market | | | | | | | | | | | 1,500 | 45 | 3,000 | 90 |
| Haddock, fresh: | | | | | | | | | | | | | | |
| Large | 4,265,660 | 202,510 | 5,401,560 | 253,370 | 8,322,425 | 288,945 | 9,655,892 | 200,419 | 7,708,900 | 181,387 | 6,562,965 | 179,834 | 5,320,990 | 142,647 |
| Scrod | 3,619,165 | 99,968 | 3,018,370 | 96,531 | 4,199,525 | 120,780 | 5,211,430 | 80,268 | 4,407,545 | 74,858 | 4,412,145 | 86,167 | 5,142,625 | 86,740 |
| Hake, fresh: | | | | | | | | | | | | | | |
| Large | 358,189 | 14,043 | 123,290 | 6,719 | 211,950 | 9,730 | 197,345 | 4,543 | 162,775 | 3,474 | 137,200 | 3,030 | 159,050 | 2,796 |
| Small | 28,100 | 1,119 | 4,695 | 264 | 17,800 | 881 | 141,240 | 4,628 | 13,600 | 412 | 58,500 | 1,740 | 76,450 | 1,562 |
| Hake, salted, large | | | | | | | | | | | | | 4,370 | 55 |
| Pollock, fresh | 504,025 | 11,714 | 569,665 | 19,734 | 457,660 | 12,188 | 695,955 | 8,931 | 421,835 | 6,026 | 218,975 | 3,695 | 332,930 | 4,977 |
| Cusk, fresh | 272,330 | 7,741 | 129,330 | 3,782 | 449,970 | 9,416 | 276,640 | 3,623 | 106,670 | 1,714 | 101,575 | 1,638 | 164,675 | 2,321 |
| Halibut, fresh | 51,860 | 6,874 | 144,875 | 20,268 | 215,317 | 25,970 | 146,989 | 14,987 | 225,549 | 22,169 | 129,496 | 13,633 | 172,524 | 18,731 |
| Mackerel: | | | | | | | | | | | | | | |
| Fresh | | | | | | | 45,410 | 3,446 | 3,211,205 | 71,814 | 2,237,830 | 65,596 | 3,325,570 | 76,061 |
| Salted | | | | | | | | | | | 1,600 | 32 | 600 | 21 |
| Flounders, fresh | 859,005 | 42,004 | 401,455 | 24,703 | 889,990 | 35,941 | 1,174,890 | 30,189 | 1,219,160 | 24,881 | 1,063,145 | 25,125 | 853,945 | 22,334 |
| Swordfish, fresh | | | | | | | | | | | 88,325 | 17,209 | 512,627 | 101,245 |
| Other, fresh | 116,699 | 3,240 | 329,584 | 9,773 | 720,270 | 16,432 | 538,435 | 8,850 | 666,952 | 11,610 | 610,974 | 11,570 | 605,791 | 10,338 |
| Total, fresh | 14,236,593 | 553,040 | 15,496,804 | 662,082 | 25,596,117 | 771,289 | 26,498,086 | 499,312 | 23,690,399 | 498,960 | 20,506,195 | 521,448 | 22,924,069 | 586,979 |
| Total, salted | | | | | | | | | | | 28,100 | 923 | 20,470 | 616 |
| Grand total | 14,236,593 | 553,040 | 15,496,804 | 662,082 | 25,596,117 | 771,289 | 26,498,086 | 499,312 | 23,690,399 | 498,960 | 20,534,295 | 522,371 | 22,944,539 | 587,595 |

NOTE.—The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. Large cod are classified as those weighing over 10 pounds; market cod, 2½ to 10 pounds; and scrod cod, 1 to 2½ pounds. Large haddock are those weighing over 2½ pounds and scrod haddock, 1 to 2½ pounds. Large hake are those weighing over 6 pounds and small hake, under 6 pounds. The statistics of the landings at Boston, have been revised from those previously published. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation.

| Species | August | | September | | October | | November | | December | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | | | | | |
| Large | 1,398,430 | $42,735 | 1,805,470 | $56,499 | 968,782 | $36,996 | 1,722,388 | $53,002 | 2,043,742 | $70,052 | 28,517,675 | $807,730 |
| Market | 3,109,720 | 63,993 | 2,475,170 | 63,574 | 2,193,330 | 58,860 | 3,338,535 | 84,018 | 5,299,230 | 128,582 | 40,544,632 | 961,060 |
| Scrod | 10,200 | 120 | 26,745 | 532 | 47,830 | 942 | 30,325 | 704 | 72,170 | 1,352 | 229,035 | 4,423 |
| Cod, salted: | | | | | | | | | | | | |
| Large | | | 9,000 | 414 | 14,000 | 626 | | | | | 60,500 | 2,336 |
| Market | | | 1,500 | 52 | 3,000 | 105 | 13,700 | 103 | | | 22,700 | 395 |
| Haddock, fresh: | | | | | | | | | | | | |
| Large | 6,401,305 | 169,351 | 4,845,095 | 170,068 | 2,687,035 | 143,933 | 3,388,690 | 141,116 | 3,716,215 | 172,064 | 68,276,732 | 2,245,644 |
| Scrod | 5,563,855 | 85,943 | 5,767,085 | 108,250 | 2,637,755 | 57,903 | 2,224,277 | 57,235 | 4,278,226 | 104,599 | 50,482,003 | 1,059,242 |
| Hake, fresh: | | | | | | | | | | | | |
| Large | 417,870 | 7,254 | 259,423 | 6,066 | 378,230 | 12,128 | 608,470 | 14,231 | 425,095 | 11,535 | 3,438,887 | 95,549 |
| Small | 111,750 | 2,564 | 81,700 | 2,373 | 83,700 | 3,387 | 108,800 | 3,465 | 43,520 | 1,549 | 769,855 | 23,944 |
| Hake, salted, large | | | | | | | | | | | 4,370 | 55 |
| Pollock, fresh | 240,180 | 4,575 | 268,210 | 4,621 | 191,825 | 3,497 | 3,190,016 | 43,496 | 1,607,595 | 22,183 | 8,698,871 | 145,637 |
| Cusk, fresh | 264,085 | 4,068 | 120,895 | 2,203 | 202,820 | 4,782 | 284,845 | 6,011 | 239,500 | 5,208 | 2,613,335 | 52,507 |
| Halibut, fresh | 117,828 | 13,091 | 194,690 | 26,770 | 128,947 | 16,689 | 73,572 | 8,173 | 44,809 | 6,371 | 1,646,456 | 193,726 |
| Mackerel, fresh | 5,743,241 | 97,071 | 5,238,140 | 72,994 | 1,176,560 | 34,000 | 24,330 | 1,561 | 50 | 5 | 21,002,336 | 422,548 |
| Mackerel, salted | | | 800 | 24 | | | | | | | 3,000 | 77 |
| Flounders, fresh | 766,730 | 27,786 | 787,026 | 34,601 | 635,825 | 32,754 | 1,066,225 | 34,542 | 1,052,429 | 39,410 | 10,769,825 | 374,270 |
| Swordfish, fresh | 474,850 | 76,574 | 226,457 | 42,035 | 11,836 | 3,191 | | | | | 1,314,095 | 240,254 |
| Other, fresh | 407,719 | 7,160 | 292,133 | 6,119 | 580,578 | 7,825 | 226,815 | 5,376 | 202,331 | 3,674 | 5,298,281 | 101,967 |
| Total, fresh | 25,027,763 | 602,285 | 22,388,239 | 596,705 | 11,925,053 | 416,887 | 16,287,788 | 452,930 | 19,024,912 | 566,584 | 243,602,018 | 6,728,501 |
| Total, salted | | | 11,300 | 490 | 17,000 | 731 | 13,700 | 103 | | | 90,570 | 2,863 |
| Grand total | 25,027,763 | 602,285 | 22,399,539 | 597,195 | 11,942,053 | 417,618 | 16,301,488 | 453,033 | 19,024,912 | 566,584 | 243,692,588 | 6,731,364 |

*Landings by fishing vessels at the three principal New England ports, 1934*—Continued

GLOUCESTER: BY MONTHS

| Species | January | | February | | March | | April | | May | | June | | July | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | | | | | | | |
| Large | 249,920 | $12,619 | 91,645 | $4,040 | 954,845 | $27,573 | 2,561,890 | $56,142 | 1,950,360 | $42,711 | 781,415 | $20,342 | 464,600 | $8,583 |
| Market | 13,866 | 562 | 3,245 | 118 | 46,120 | 1,014 | 736,132 | 13,246 | 495,920 | 8,378 | 483,440 | 6,511 | 444,525 | 5,584 |
| Scrod | 1,455 | 36 | 240 | 6 | 1,650 | 30 | | | 16,330 | 257 | 505 | 4 | 1,165 | 10 |
| Cod, salted | | | | | | | | | | | | | | |
| Large | | | | | 3,420 | 154 | 3,900 | 137 | 77,970 | 2,340 | 11,400 | 371 | 125,899 | 4,506 |
| Market | | | | | | | 600 | 15 | 29,550 | 591 | 4,080 | 92 | 108,034 | 2,711 |
| Scrod | | | | | | | | | | | | | 29,132 | 437 |
| Haddock, fresh: | | | | | | | | | | | | | | |
| Large | 27,370 | 1,757 | 24,340 | 1,395 | 84,410 | 2,727 | 706,040 | 19,628 | 598,105 | 12,135 | 232,838 | 4,350 | 238,575 | 4,856 |
| Scrod | 920 | 27 | 1,245 | 35 | 10,125 | 211 | 203,505 | 3,137 | 151,680 | 2,300 | 338,417 | 4,959 | 606,500 | 7,583 |
| Hake, fresh: | | | | | | | | | | | | | | |
| Large | 23,915 | 988 | 12,600 | 600 | 10,580 | 155 | 6,635 | 126 | 12,820 | 102 | 6,490 | 89 | 26,365 | 202 |
| Small | | | | | | | 250 | 5 | | | | | | |
| Pollock, fresh | 218,710 | 6,935 | 27,035 | 1,019 | 6,120 | 65 | 45,255 | 680 | 67,450 | 506 | 7,355 | 69 | 23,725 | 184 |
| Pollock, salted | | | | | | | | | | | | | | |
| Cusk, fresh | 5,250 | 125 | 7,360 | 176 | 7,960 | 144 | 50,215 | 612 | 17,955 | 133 | 6,570 | 45 | 40,900 | 300 |
| Cusk, salted | | | | | | | | | | | | | 700 | 14 |
| Halibut, fresh | 235 | 42 | 49 | 7 | 10 | 1 | | | 106 | 10 | | | | |
| Halibut, salted | | | | | | | | | | | | | 4,120 | 215 |
| Mackerel, fresh | | | | | | | | | 596,465 | 7,302 | 545,820 | 8,632 | 807,440 | 11,861 |
| Mackerel, salted | | | | | | | | | | | 34,550 | 719 | 151,270 | 5,401 |
| Flounders, fresh | 54,905 | 2,470 | 43,750 | 2,836 | 60,940 | 1,911 | 6,910 | 179 | 34,995 | 703 | 31,255 | 401 | 12,850 | 200 |
| Swordfish, fresh | | | | | | | | | | | | | 1,608 | 259 |
| Other, fresh | 8,390 | 56 | 9,825 | 135 | 14,545 | 145 | 44,400 | 800 | 19,620 | 199 | 97,550 | 1,087 | 141,890 | 1,365 |
| Total, fresh | 604,936 | 25,617 | 221,334 | 10,367 | 1,197,305 | 33,976 | 4,361,232 | 94,555 | 3,871,806 | 74,736 | 2,531,655 | 46,489 | 2,810,143 | 40,987 |
| Total, salted | | | | | 3,420 | 154 | 4,500 | 152 | 107,520 | 2,931 | 50,030 | 1,182 | 419,155 | 13,284 |
| Grand total | 604,936 | 25,617 | 221,334 | 10,367 | 1,200,725 | 34,130 | 4,365,732 | 94,707 | 3,979,326 | 77,667 | 2,581,685 | 47,671 | 3,229,298 | 54,271 |

| Species | August | | September | | October | | November | | December | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | | | | | |
| Large | 176,105 | $5,823 | 135,173 | $5,006 | 403,385 | $20,443 | 78,811 | $4,207 | 76,030 | $2,653 | 7,924,179 | $210,142 |
| Market | 340,085 | 7,064 | 17,080 | 560 | 617,790 | 12,793 | 8,715 | 212 | 59,390 | 1,059 | 3,266,308 | 57,101 |
| Scrod | | | | | 6,265 | 92 | 265 | 4 | 1,340 | 24 | 29,215 | 463 |
| Cod, salted: | | | | | | | | | | | | |
| Large | 312,683 | 9,380 | 167,619 | 5,029 | 402,531 | 12,004 | 98,793 | 3,458 | | | 1,204,215 | 37,379 |
| Market | 271,698 | 5,436 | 115,814 | 2,317 | 117,643 | 2,948 | 53,602 | 1,340 | | | 701,021 | 15,450 |
| Scrod | 78,976 | 1,185 | 19,881 | 199 | 28,719 | 431 | 38,660 | 580 | | | 195,368 | 2,832 |
| Haddock, fresh: | | | | | | | | | | | | |
| Large | 133,045 | 4,329 | 84,210 | 3,264 | 260,620 | 6,426 | 10,795 | 567 | 70,240 | 2,234 | 2,470,588 | 63,668 |
| Scrod | 349,000 | 7,637 | 157,450 | 3,667 | 537,525 | 7,833 | 15,580 | 267 | 48,745 | 731 | 2,420,692 | 38,387 |
| Haddock, salted, large | 2,000 | 70 | | | 4,000 | 60 | | | | | 6,000 | 130 |
| Hake, fresh: | | | | | | | | | | | | |
| Large | 5,770 | 100 | 13,975 | 374 | 279,760 | 9,456 | 109,930 | 3,450 | 43,335 | 982 | 552,175 | 16,624 |
| Small | 290 | 5 | 660 | 12 | | | | | | | 1,200 | 22 |
| Hake, salted, large | 500 | 8 | 7,360 | 110 | 1,530 | 38 | | | | | 9,390 | 156 |
| Pollock, fresh | 39,005 | 755 | 352,780 | 6,745 | 1,418,960 | 32,569 | 6,299,160 | 77,983 | 2,635,400 | 33,211 | 11,140,955 | 160,721 |
| Pollock, salted | 280 | 5 | 510 | 8 | | | | | | | 790 | 13 |
| Cusk, fresh | 31,885 | 476 | 2,585 | 41 | 1,140 | 20 | 4,655 | 95 | 10,845 | 203 | 187,320 | 2,373 |
| Cusk, salted | 500 | 9 | | | 400 | 10 | | | | | 1,600 | 33 |
| Halibut, fresh | | | | | 12 | 2 | | | 239 | 33 | 651 | 95 |
| Halibut, salted | | | | | | | | | | | 4,120 | 215 |
| Mackerel, fresh | 2,503,865 | 28,571 | 3,042,710 | 36,014 | 375,390 | 5,737 | 54,980 | 3,871 | 11,625 | 1,063 | 7,848,295 | 103,051 |
| Mackerel, salted | 99,380 | 2,800 | 125,900 | 3,463 | 6,680 | 144 | 29,200 | 1,022 | | | 446,980 | 13,549 |
| Flounders, fresh | 3,490 | 78 | 9,390 | 548 | 51,820 | 1,076 | 27,935 | 1,025 | 28,755 | 1,176 | 366,995 | 12,603 |
| Swordfish, fresh | 3,075 | 663 | 4,466 | 670 | 130 | 28 | | | | | 9,279 | 1,620 |
| Herring, salted | | | | | | | | | 262,200 | 7,935 | 262,200 | 7,935 |
| Other, fresh | 35,438 | 437 | 146,320 | 1,173 | 499,255 | 5,044 | 19,383 | 217 | 44,037 | 479 | 1,080,653 | 11,137 |
| Total, fresh | 3,621,053 | 55,938 | 3,966,799 | 58,077 | 4,452,052 | 101,519 | 6,630,209 | 91,898 | 3,029,981 | 43,848 | 37,298,505 | 678,007 |
| Total, salted | 766,017 | 18,893 | 437,084 | 11,126 | 561,503 | 15,635 | 220,255 | 6,400 | 262,200 | 7,935 | 2,831,684 | 77,692 |
| Grand total | 4,387,070 | 74,831 | 4,403,883 | 69,203 | 5,013,555 | 117,154 | 6,850,464 | 98,298 | 3,292,181 | 51,783 | 40,130,189 | 755,699 |

*Landings by fishing vessels at the three principal New England ports, 1934*—Continued

PORTLAND: BY MONTHS

| Species | January | | February | | March | | April | | May | | June | | July | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | | | | | | | |
| Large | 72,843 | $2,933 | 65,522 | $3,171 | 181,158 | $5,013 | 705,662 | $13,793 | 354,085 | $6,561 | 525,515 | $13,060 | 427,837 | $10,315 |
| Market | 42,179 | 1,177 | 39,090 | 1,421 | 184,136 | 3,940 | 885,465 | 17,059 | 217,426 | 3,503 | 38,147 | 624 | 14,017 | 183 |
| Scrod | 1,730 | 17 | 1,005 | 8 | 360 | 3 | 1,150 | 6 | 130 | | 270 | 2 | 685 | 3 |
| Haddock, fresh: | | | | | | | | | | | | | | |
| Large | 163,772 | 9,663 | 100,780 | 6,354 | 165,832 | 6,927 | 1,217,275 | 23,935 | 825,593 | 16,191 | 79,318 | 3,423 | 182,455 | 5,863 |
| Scrod | 2,796 | 40 | 700 | 14 | 6,342 | 112 | 637,005 | 12,118 | 232,128 | 4,097 | 1,280 | 9 | 3,359 | 27 |
| Hake, fresh: | | | | | | | | | | | | | | |
| Large | 63,902 | 2,389 | 20,357 | 1,102 | 52,969 | 2,198 | 69,172 | 1,496 | 104,883 | 1,734 | 138,948 | 2,501 | 163,584 | 1,683 |
| Small | 1,770 | 19 | 1,315 | 12 | 4,895 | 42 | 2,595 | 16 | 360 | 2 | 2,302 | 31 | 820 | 4 |
| Pollock, fresh | 24,660 | 402 | 11,220 | 274 | 37,472 | 500 | 60,127 | 305 | 46,437 | 285 | 54,029 | 427 | 56,469 | 434 |
| Cusk, fresh | 90,963 | 2,567 | 56,709 | 2,031 | 155,713 | 3,769 | 204,332 | 2,573 | 114,432 | 1,490 | 79,900 | 1,335 | 40,292 | 588 |
| Halibut, fresh | 370 | 57 | 166 | 29 | 857 | 129 | 10,442 | 934 | 39,921 | 738 | 16,557 | 2,893 | 25,343 | 3,299 |
| Mackerel, fresh | | | | | | | | | | | 100,156 | 2,414 | 22,552 | 340 |
| Mackerel, salted | | | | | | | | | | | 1,425 | 28 | | |
| Flounders, fresh | 29,542 | 1,134 | 22,256 | 1,143 | 81,315 | 2,292 | 62,570 | 854 | 57,977 | 1,096 | 69,024 | 1,148 | 66,665 | 1,121 |
| Swordfish, fresh | | | | | | | | | | | | | 70,953 | 13,023 |
| Herring, fresh | | | | | | | | | | | 116,400 | 723 | 161,200 | 1,414 |
| Other, fresh | 4,347 | 160 | 3,506 | 169 | 8,496 | 293 | 27,444 | 208 | 39,013 | 1,791 | 20,250 | 1,752 | 70,749 | 1,495 |
| Total, fresh | 498,874 | 20,558 | 322,626 | 15,728 | 879,545 | 25,218 | 3,883,239 | 73,297 | 2,032,385 | 37,488 | 1,242,096 | 30,342 | 1,306,980 | 39,792 |
| Total, salted | | | | | | | | | | | 1,425 | 28 | | |
| Grand total | 498,874 | 20,558 | 322,626 | 15,728 | 879,545 | 25,218 | 3,883,239 | 73,297 | 2,032,385 | 37,488 | 1,243,521 | 30,370 | 1,306,980 | 39,792 |

| Species | August | | September | | October | | November | | December | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | | | | | |
| Large | 501,079 | $17,873 | 236,292 | $9,514 | 132,637 | $6,592 | 90,782 | $3,967 | 39,065 | $1,727 | 3,332,477 | $94,519 |
| Market | 12,993 | 203 | 13,601 | 268 | 27,148 | 643 | 29,869 | 797 | 13,244 | 379 | 1,517,315 | 30,197 |
| Scrod | 195 | 1 | 690 | 6 | 400 | 4 | 1,052 | 11 | 775 | 6 | 8,442 | 67 |
| Cod, salted: | | | | | | | | | | | | |
| Large | 14,910 | 522 | | | | | | | | | 14,910 | 522 |
| Market | 2,960 | 89 | | | | | | | | | 2,960 | 89 |
| Haddock, fresh: | | | | | | | | | | | | |
| Large | 160,503 | 5,805 | 97,281 | 5,609 | 58,267 | 3,997 | 109,053 | 6,662 | 61,779 | 3,984 | 3,221,908 | 98,413 |
| Scrod | 2,320 | 20 | 2,247 | 22 | 1,026 | 19 | 1,775 | 22 | 780 | 6 | 891,758 | 16,506 |
| Hake, fresh: | | | | | | | | | | | | |
| Large | 342,952 | 3,933 | 294,105 | 4,931 | 546,843 | 12,470 | 328,966 | 8,614 | 163,458 | 5,361 | 2,290,139 | 48,412 |
| Small | 5,250 | 39 | 2,470 | 14 | 1,890 | 16 | 2,235 | 21 | 1,525 | 14 | 27,427 | 230 |
| Hake, salted, large | 175 | 3 | | | | | | | | | 175 | 3 |
| Pollock, fresh | 113,586 | 1,293 | 196,333 | 2,190 | 158,763 | 1,856 | 159,817 | 1,456 | 36,780 | 512 | 955,693 | 9,934 |
| Pollock, salted | 110 | 2 | | | | | | | | | 110 | 2 |
| Cusk, fresh | 41,811 | 626 | 37,736 | 862 | 121,250 | 2,855 | 108,740 | 2,670 | 69,590 | 1,954 | 1,121,468 | 23,320 |
| Cusk, salted | 125 | 2 | | | | | | | | | 125 | 2 |
| Halibut, fresh | 27,259 | 1,968 | 8,095 | 1,051 | 340 | 50 | 1,023 | 147 | 146 | 30 | 130,519 | 11,325 |
| Mackerel, fresh | 321,569 | 2,961 | 673,984 | 4,973 | 100,910 | 1,871 | 9,105 | 619 | | | 1,228,276 | 13,178 |
| Mackerel, salted | 15,800 | 59 | | | | | | | | | 17,225 | 87 |
| Flounders, fresh | 50,281 | 1,181 | 16,908 | 522 | 7,650 | 351 | 6,300 | 197 | 37,706 | 1,457 | 508,194 | 12,496 |
| Swordfish, fresh | 41,354 | 6,160 | 27,812 | 4,792 | | | | | | | 140,119 | 23,975 |
| Herring, fresh | 117,800 | 734 | | | | | | | | | 395,400 | 2,871 |
| Other, fresh | 47,935 | 1,989 | 13,316 | 295 | 16,823 | 303 | 19,530 | 410 | 16,995 | 321 | 288,404 | 9,186 |
| Total, fresh | 1,786,887 | 44,786 | 1,620,870 | 35,049 | 1,173,947 | 31,027 | 868,247 | 25,593 | 441,843 | 15,751 | 16,057,539 | 394,629 |
| Total, salted | 34,080 | 677 | | | | | | | | | 35,505 | 705 |
| Grand total | 1,820,967 | 45,463 | 1,620,870 | 35,049 | 1,173,947 | 31,027 | 868,247 | 25,593 | 441,843 | 15,751 | 16,093,044 | 395,334 |

*Landings by fishing vessels at the three principal New England ports, 1934*—Continued

SUMMARY: BY PORTS

| Species | Boston | | Gloucester | | Portland | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod, fresh: | | | | | | | | |
| Large | 28,517,675 | $807,730 | 7,924,179 | $210,142 | 3,332,477 | $94,519 | 39,774,331 | $1,112,391 |
| Market | 40,544,632 | 961,060 | 3,266,308 | 57,101 | 1,517,315 | 30,197 | 45,328,255 | 1,048,358 |
| Scrod | 229,035 | 4,423 | 29,215 | 463 | 8,442 | 67 | 266,692 | 4,953 |
| Cod, salted: | | | | | | | | |
| Large | 60,500 | 2,336 | 1,204,215 | 37,379 | 14,910 | 522 | 1,279,625 | 40,237 |
| Market | 22,700 | 395 | 701,021 | 15,450 | 2,960 | 89 | 726,681 | 15,934 |
| Scrod | | | 195,368 | 2,832 | | | 195,368 | 2,832 |
| Haddock, fresh: | | | | | | | | |
| Large | 68,276,732 | 2,245,644 | 2,470,588 | 63,668 | 3,221,908 | 98,413 | 73,969,228 | 2,407,725 |
| Scrod | 50,482,003 | 1,059,242 | 2,420,692 | 38,387 | 891,758 | 16,506 | 53,794,453 | 1,114,135 |
| Haddock, salted, large | | | 6,000 | 130 | | | 6,000 | 130 |
| Hake, fresh: | | | | | | | | |
| Large | 3,438,887 | 95,549 | 552,175 | 16,624 | 2,290,139 | 48,412 | 6,281,201 | 160,585 |
| Small | 769,855 | 23,944 | 1,200 | 22 | 27,427 | 230 | 798,482 | 24,196 |
| Hake, salted, large | 4,370 | 55 | 9,390 | 156 | 175 | 3 | 13,935 | 214 |
| Pollock, fresh | 8,698,871 | 145,637 | 11,140,955 | 160,721 | 955,693 | 9,934 | 20,795,519 | 316,292 |
| Pollock, salted | | | 790 | 13 | 110 | 2 | 900 | 15 |
| Cusk, fresh | 2,613,335 | 52,507 | 187,320 | 2,373 | 1,121,468 | 23,320 | 3,922,123 | 78,200 |
| Cusk, salted | | | 1,600 | 33 | 125 | 2 | 1,725 | 35 |
| Halibut, fresh | 1,646,456 | 193,726 | 651 | 95 | 130,519 | 11,325 | 1,777,626 | 205,146 |
| Halibut, salted | | | 4,120 | 215 | | | 4,120 | 215 |
| Mackerel, fresh | 21,002,336 | 422,548 | 7,848,295 | 103,051 | 1,228,276 | 13,178 | 30,078,907 | 538,777 |
| Mackerel, salted | 3,000 | 77 | 446,980 | 13,549 | 17,225 | 87 | 467,205 | 13,713 |
| Flounders, fresh | 10,769,825 | 374,270 | 366,995 | 12,603 | 508,194 | 12,496 | 11,645,014 | 399,369 |
| Swordfish, fresh | 1,314,095 | 240,254 | 9,279 | 1,620 | 140,119 | 23,975 | 1,463,493 | 265,849 |
| Herring, fresh | | | | | 395,400 | 2,871 | 395,400 | 2,871 |
| Herring, salted | | | 262,200 | 7,935 | | | 262,200 | 7,935 |
| Other, fresh | 5,298,281 | 101,967 | 1,080,653 | 11,137 | 288,404 | 9,186 | [1] 6,667,338 | 122,290 |
| Total, fresh | 243,602,018 | 6,728,501 | 37,298,505 | 678,007 | 16,057,539 | 394,629 | 296,958,062 | 7,801,137 |
| Total, salted | 90,570 | 2,863 | 2,831,684 | 77,692 | 35,505 | 705 | 2,957,759 | 81,260 |
| Grand total | 243,692,588 | 6,731,364 | 40,130,189 | 755,699 | 16,093,044 | 395,334 | 299,915,821 | 7,882,397 |

[1] The items under "Other, fresh" include alewives, 336,460 pounds, value $2,506; butterfish, 98,324 pounds, value $7,543; cunner (perch), 600 pounds, value $6; eels, 4,160 pounds, value $147; frigate mackerel, 10,965 pounds, value $548; herring smelt, 19,187 pounds, value $514; rosefish, 1,841,451 pounds, value $18,786; scup, 1,100 pounds, value $43; sea robins, 1,665 pounds, value $34; shad, 178,420 pounds, value $2,170; sharks, 25,252 pounds, value $441; skates, 6,930 pounds, value $97; squeteagues, gray, 20 pounds, value $2; sturgeon, 1,429 pounds, value $121; tuna or "horse mackerel", 11,762 pounds, value $385; whiting, 669,713 pounds, value $10,437; wolffish, 3,241,429 pounds, value $66,589; mixed fish, 18,915 pounds, value $141; lobsters, 82 pounds, value $25; scallops, 50,897 pounds, value $5,513; shrimp, 400 pounds, value $48; squid, 4,060 pounds, value $234; livers, 65,043 pounds, value $1,461; sounds, 600 pounds, value $24; spawn, 75,964 pounds, value $4,424; and tongues, 2,510 pounds, value $51.

BIOLOGICAL ASPECT

In 1934 the fishing fleet landing fares at Boston and Gloucester, Mass., and Portland, Maine, and operating on the fishing banks of the North Atlantic, numbered 393 steam, motor, and sail vessels of 5-net-ton capacity or greater as measured by the United States Customs Service. These vessels made 12,323 trips to the fishing grounds, and were absent from port 52,441 days, or an average of 4.2 days per trip. The catch of edible fish landed at the three ports amounted to 302,262,030 pounds when the salted fish had been converted to the basis of fresh gutted or round fish as usually landed. This, however, does not represent the entire catch of edible fish of these vessels, for small quantities, estimated at not more than 5 percent of their total catch, were landed at ports in New England other than these three, at New York City and at ports in New Jersey.

Otter trawls on all sizes of vessels accounted for 194,453,361 pounds, or 64 percent of the total landings. Line trawls were next in importance, accounting for 55,214,633 pounds, or 18 percent of the total landings.

The catch taken on Sable Island Bank and landed at the three ports amounted to 101,088,595 pounds, or 33 percent of the total; that on shore grounds, 72,469,490 pounds, or 24 percent; Georges Bank, 41,181,940 pounds, or 14 percent; Browns Bank, 28,461,481 pounds, or 9 percent; South Channel, 19,289,022 pounds, or 6 percent; and Quereau Bank, 15,232,367 pounds, or 5 percent. No other bank accounted for as much as 5,000,000 pounds in the landings at the three ports.

*Landings by fishing vessels at the three principal New England ports, 1934*

BY GEAR AND FISHING GROUNDS

| Gear and fishing grounds | Vessels fishing | Trips | Days absent | Cod | | | Haddock | | Hake | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Large | Market | Scrod | Large | Scrod | Large | Small |
| Line trawls: | *Number* | *Number* | *Number* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Grand Bank | 3 | 5 | 178 | 38,648 | 9,076 | | | | | |
| Green Bank | 2 | 3 | 87 | 47,576 | 3,220 | | | | 16,891 | |
| St. Peters Bank | 2 | 3 | 45 | 2,500 | 4,000 | | 7,500 | | | |
| Off Newfoundland (Treaty Coast) | 1 | 1 | 31 | 396,300 | 66,462 | 34,157 | | | | |
| Bay of Fundy | 3 | 4 | 16 | 5,340 | 2,817 | | 260 | | 16,105 | |
| Gulf of St. Lawrence | 5 | 8 | 284 | 1,360,395 | 1,183,148 | 352,632 | 15,180 | | 2,835 | |
| Quereau Bank | 6 | 13 | 265 | 258,755 | 112,640 | 995 | 17,800 | 9,900 | 36,590 | |
| Sable Island Bank (Western Bank) | 34 | 77 | 1,027 | 2,207,798 | 1,956,256 | 5,570 | 1,782,350 | 247,095 | 91,047 | 11,400 |
| Sable Island Bank (Western Bank) (occasional) | | | | | | | 19,225 | | | |
| Cape Shore | 31 | 78 | 1,073 | 746,725 | 1,251,843 | 400 | 1,282,645 | 305,600 | 308,249 | |
| La Have Bank | 28 | 52 | 608 | 690,946 | 886,577 | | 845,100 | 241,350 | 87,060 | |
| Roseway Bank | 5 | 5 | 52 | 75,900 | 106,600 | | 55,000 | 18,300 | 9,480 | |
| Browns Bank | 35 | 230 | 2,620 | 3,201,138 | 3,341,586 | 5,300 | 5,607,133 | 1,198,982 | 450,295 | 6,500 |
| Georges Bank | 30 | 76 | 733 | 1,549,070 | 572,316 | | 1,260,965 | 87,800 | 58,460 | |
| South Channel | 35 | 146 | 1,163 | 1,270,095 | 886,655 | | 3,412,000 | 118,735 | 295,585 | 2,750 |
| South Channel (occasional) | | | | 7,200 | 1,800 | | | | | |
| Off Highland Light | 8 | 15 | 79 | 13,810 | 9,855 | | 111,810 | 1,705 | 20,740 | 2,400 |
| Off Chatham | 6 | 13 | 84 | 30,535 | 18,470 | | 124,605 | 7,850 | 27,420 | |
| Nantucket Shoals | 2 | 2 | 18 | 4,080 | 1,800 | | 11,950 | | 12,500 | |
| Grand Manan | 1 | 1 | 8 | 3,065 | 1,105 | | | 985 | 755 | |
| Bank Comfort | 1 | 1 | 2 | 545 | 100 | | 417 | | 4,850 | |
| Cashes Bank | 25 | 90 | 499 | 290,297 | 185,280 | 2,930 | 381,985 | 25,845 | 535,795 | 47,545 |
| Fippenies Bank | 13 | 16 | 85 | 42,050 | 19,970 | 530 | 81,235 | 3,655 | 47,780 | 7,310 |
| Platts Bank | 12 | 37 | 77 | 42,320 | 17,115 | 1,287 | 73,383 | 1,906 | 69,360 | 1,975 |
| Jeffreys Ledge | 19 | 98 | 213 | 72,525 | 30,922 | 1,360 | 222,585 | 3,715 | 150,255 | 3,170 |
| Middle Bank (Stellwagen) | 14 | 71 | 346 | 60,180 | 28,045 | | 376,465 | 4,780 | 170,300 | |
| Shore, general | 87 | 1,121 | 2,752 | 939,700 | 527,901 | 16,420 | 1,279,686 | 90,051 | 1,755,699 | 222,615 |
| Shore, general (occasional) | | | | 3,400 | 800 | | 1,000 | | | 600 |
| Total | [1] 116 | 2,166 | 12,345 | 13,360,893 | 11,226,359 | 421,851 | 16,970,279 | 2,368,254 | 4,168,051 | 306,265 |
| Hand lines: | | | | | | | | | | |
| Cape Shore | 3 | 4 | 66 | 35,550 | 54,795 | | 6,575 | 800 | 800 | |
| Georges Bank | 5 | 14 | 164 | 209,125 | 101,475 | | 800 | | | |
| Georges Bank (occasional) | | | | 3,000 | 3,000 | | | | | |
| Nantucket Shoals | 2 | 7 | 55 | 37,100 | 30,330 | | 390 | | | |
| Shore, general | 2 | 5 | 17 | 16,925 | 4,710 | | 460 | | 1,360 | |
| Shore, general (occasional) | | | | | 60 | | 50 | 25 | 40 | |
| Total | [1] 9 | 30 | 302 | 301,700 | 194,370 | | 8,275 | 825 | 2,200 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Harpoons: | | | | | | | | | | |
| Sable Island Bank (Western Bank) | 3 | 3 | 68 | | | | | | | |
| Cape Shore | 35 | 36 | 932 | | | | | | | |
| La Have Bank | 1 | 1 | 22 | | | | | | | |
| Browns Bank | 42 | 58 | 1,208 | | | | | | | |
| Georges Bank | 49 | 74 | 1,530 | | | | | | | |
| South Channel | 1 | 1 | 4 | | | | | | | |
| Nantucket Shoals | 3 | 3 | 51 | | | | | | | |
| South | 3 | 3 | 57 | | | | | | | |
| Shore, general | 3 | 5 | 59 | | | | | | | |
| Total | [1] 58 | 184 | 3,931 | | | | | | | |
| Otter trawls, large: | | | | | | | | | | |
| St. Peters Bank | 3 | 3 | 39 | 52,000 | 138,390 | | 174,950 | 10,400 | | |
| Gulf of St. Lawrence | 1 | 1 | 14 | 1,000 | 8,750 | | 31,700 | 21,000 | 93,800 | |
| Quereau Bank | 46 | 115 | 1,508 | 1,128,415 | 5,337,840 | 60,890 | 1,705,415 | 5,464,440 | 33,525 | |
| Sable Island Bank (Western Bank) | 54 | 602 | 7,337 | 11,957,459 | 18,034,093 | 23,770 | 21,894,178 | 30,103,083 | 453,323 | 18,750 |
| Cape Shore | 2 | 3 | 28 | 4,200 | 8,200 | | 84,050 | 13,500 | 7,425 | |
| Emerald Bank | 7 | 10 | 113 | 172,920 | 306,110 | | 375,800 | 162,670 | 7,050 | |
| La Have Bank | 6 | 8 | 103 | 153,980 | 190,250 | | 185,165 | 129,295 | 21,265 | |
| Browns Bank | 40 | 89 | 963 | 1,258,106 | 1,365,896 | 250 | 3,638,469 | 2,357,695 | 47,085 | |
| Georges Bank | 49 | 255 | 2,732 | 2,373,535 | 4,146,720 | 95,785 | 9,724,060 | 6,484,145 | 157,290 | |
| South Channel | 28 | 54 | 577 | 362,470 | 509,615 | 3,400 | 3,117,120 | 985,460 | 48,945 | |
| Middle Bank (Stellwagen) | 3 | 3 | 26 | 19,000 | 16,800 | | 169,300 | 115,000 | 1,500 | |
| Shore, general | 12 | 14 | 143 | 375,150 | 537,200 | | 473,450 | 406,550 | 4,400 | 7,200 |
| Total | [1] 57 | 1,157 | 13,583 | 17,858,235 | 30,599,864 | 184,095 | 41,573,657 | 46,253,238 | 875,608 | 25,950 |
| Otter trawls, medium: | | | | | | | | | | |
| Quereau Bank | 3 | 4 | 41 | 18,250 | 120,400 | | 22,600 | 23,700 | 1,950 | |
| Sable Island Bank (Western Bank) | 13 | 57 | 627 | 876,530 | 931,940 | | 1,996,725 | 1,112,350 | 36,210 | 850 |
| Sable Island Bank (Western Bank) (occasional) | | | | | 9,000 | | | 10,800 | | |
| Cape Shore | 6 | 7 | 68 | 4,215 | 15,690 | | 75,050 | 90,075 | 3,665 | |
| Emerald Bank | 2 | 3 | 32 | 31,645 | 37,925 | 190 | 55,300 | 13,100 | 4,380 | |
| La Have Bank | 4 | 4 | 39 | 35,910 | 43,960 | 3,925 | 22,500 | 26,400 | 1,350 | |
| Browns Bank | 21 | 45 | 453 | 314,645 | 440,325 | | 1,404,125 | 575,825 | 7,470 | |
| Georges Bank | 37 | 264 | 2,533 | 1,582,530 | 1,293,880 | 11,100 | 5,261,220 | 1,945,500 | 41,330 | 1,850 |
| South Channel | 27 | 148 | 1,312 | 419,210 | 617,305 | 11,450 | 3,492,120 | 1,024,150 | 45,803 | |
| South Channel (occasional) | | | | 3,100 | 3,500 | | 25,600 | 5,000 | 600 | |
| Off Highland Light | 9 | 13 | 83 | 6,240 | 5,190 | | 79,850 | 14,520 | 4,105 | |
| Off Chatham | 13 | 40 | 305 | 61,205 | 314,512 | 1,900 | 479,095 | 66,050 | 10,190 | 800 |
| Nantucket Shoals | 5 | 7 | 64 | 16,700 | 56,450 | | 100,400 | 32,600 | 2,200 | |
| Cashes Bank | 2 | 2 | 14 | 620 | 655 | | 7,960 | 7,085 | 1,035 | |
| Middle Bank (Stellwagen) | 4 | 4 | 18 | 3,975 | 2,770 | 950 | 12,875 | 3,220 | 4,625 | |
| Shore, general | 72 | 649 | 2,206 | 318,345 | 251,585 | 8,780 | 706,695 | 153,703 | 80,520 | 148,590 |
| Total | [1] 87 | 1,247 | 7,795 | 3,693,120 | 4,145,087 | 38,295 | 13,742,115 | 5,104,078 | 245,433 | 152,090 |
| Otter trawls, small: | | | | | | | | | | |
| Sable Island Bank (Western Bank) | 1 | 2 | 14 | 110 | 20 | | 15 | | | 600 |
| Georges Bank | 2 | 2 | 13 | 1,225 | 2,725 | | 16,825 | 5,300 | | |
| South Channel | 3 | 4 | 23 | 650 | 25,375 | 800 | 33,400 | 21,600 | 500 | 600 |
| Off Highland Light | 1 | 1 | 11 | 660 | 700 | | 1,850 | | 50 | |

[1] Exclusive of duplication.

*Landings by fishing vessels at the three prineipal New England ports, 1934*—Continued

BY GEAR AND FISHING GROUNDS—Continued

| Gear and fishing grounds | Vessels fishing | Trips | Days absent | Cod | | | Haddock | | Hake | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Large | Market | Scrod | Large | Scrod | Large | Small |
| | *Number* | *Number* | *Number* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Otter trawls, small—Continued. | | | | | | | | | | |
| Nantucket Shoals | 1 | 1 | 11 | 100 | 700 | | 5,900 | | | |
| Shore, general | 96 | 1,603 | 4,659 | 640,213 | 391,288 | 8,695 | 1,287,498 | 41,155 | 444,502 | 312,937 |
| Shore, general (occasional) | | | | | | | | | | |
| Total | [1] 100 | 1,613 | 4,731 | 642,958 | 420,808 | 9,495 | 1,345,488 | 68,055 | 445,052 | 314,137 |
| Sink gill nets: | | | | | | | | | | |
| Jeffreys Ledge | 1 | 2 | 2 | 845 | 420 | | 150 | | 1,849 | |
| Shore, general | 25 | 4,180 | 4,182 | 6,347,478 | 151,106 | 55 | 341,624 | 3 | 569,484 | 40 |
| Total | [1] 25 | 4,182 | 4,184 | 6,348,323 | 151,526 | 55 | 341,774 | 3 | 571,333 | 40 |
| Drift gill nets: | | | | | | | | | | |
| Bay of Islands | 1 | 1 | 28 | | | | | | | |
| Off Newfoundland (Treaty Coast) | 1 | 1 | 28 | | | | | | | |
| Gulf of St. Lawrence (occasional) | | | | | | | | | | |
| Shore, general | 18 | 84 | 181 | | | | | | | |
| Shore, general (occasional) | | | | | | | | | | |
| Total | [1] 19 | 86 | 237 | | | | | | | |
| Purse seines: | | | | | | | | | | |
| Sable Island Bank (Western Bank) | 1 | 1 | 12 | | | | | | | |
| Georges Bank | 1 | 1 | 3 | | | | | | | |
| South Channel | 38 | 64 | 202 | 390 | | | | | | |
| Off Highland Light | 2 | 2 | 7 | | | | | | | |
| Off Chatham | 17 | 22 | 68 | | | | | | | |
| Nantucket Shoals | 3 | 3 | 13 | | | | | | | |
| Middle Bank (Stellwagen) | 5 | 7 | 23 | | | | | | | |
| South | 22 | 30 | 122 | | | | | | | |
| Shore, general | 94 | 1,521 | 4,811 | | | | | | | |
| Total | [1] 95 | 1,651 | 5,261 | [2] 390 | | | | | | |
| Scallop drags: | | | | | | | | | | |
| Georges Bank | 1 | 7 | 72 | | | | | | | |
| Georges Bank (occasional) | | | | | | | | | | |
| Total | 1 | 7 | 72 | | | | | | | |
| Grand total | [1] 393 | 12,323 | 52,441 | 42,205,619 | 46,738,014 | 653,521 | 73,981,588 | 53,794,453 | 6,307,677 | 798,482 |

| Gear and fishing grounds | Pollock | Cusk | Halibut | Flounders | Swordfish | Mackerel | Other | Total |
|---|---|---|---|---|---|---|---|---|
| Line trawls: | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Grand Bank | | 945 | 89, 264 | | | | | 137, 933 |
| Green Bank | | 760 | 127, 075 | | 715 | | | 196, 237 |
| St. Peters Bank | | | 98, 307 | | | | | 112, 307 |
| Off Newfoundland (Treaty Coast) | | | | | | | | 496, 919 |
| Bay of Fundy | 680 | 56, 087 | | | | | | 81, 289 |
| Gulf of St. Lawrence | 165 | | 16, 256 | 4, 685 | | | | 2, 935, 296 |
| Querean Bank | 1, 180 | 43, 600 | 281, 903 | | 180 | | | 763, 543 |
| Sable Island Bank (Western Bank) | 67, 474 | 88, 977 | 157, 348 | 4, 250 | 127 | | 2, 710 | 6, 622, 462 |
| Sable Island Bank (Western Bank) (occasional) | | | | | | | | 19, 225 |
| Cape Shore | 56, 075 | 273, 440 | 10, 670 | 3, 625 | | | 53, 995 | 4, 293, 267 |
| La Have Bank | 37, 580 | 131, 865 | 134, 561 | 2, 950 | 1, 925 | | 6, 705 | 3, 066, 619 |
| Roseway Bank | 2, 540 | 27, 480 | 1, 375 | | | | 7, 380 | 304, 055 |
| Browns Bank | 227, 469 | 835, 525 | 198, 781 | 13, 300 | 2, 701 | | 107, 986 | 15, 196, 696 |
| Georges Bank | 66, 507 | 147, 745 | 76, 117 | 8, 575 | 550 | | 4, 835 | 3, 832, 940 |
| South Channel | 219, 975 | 80, 045 | 22, 887 | 2, 970 | 425 | 1, 375 | 35, 065 | 6, 348, 562 |
| South Channel (occasional) | 185 | | | | | | | 9, 185 |
| Off Highland Light | 3, 770 | 9, 550 | 776 | | | | 845 | 175, 261 |
| Off Chatham | 8, 700 | 2, 190 | 1, 068 | 2, 695 | | | 24, 750 | 248, 283 |
| Nantucket Shoals | 905 | 2, 700 | | | | | 200 | 34, 135 |
| Grand Manan | 3, 335 | 5, 015 | 79 | | | | | 14, 339 |
| Bank Comfort | 100 | 6, 625 | | | | | | 12, 637 |
| Cashes Bank | 64, 150 | 612, 350 | 5, 481 | 25 | | | 5, 232 | 2, 156, 915 |
| Fippenies Bank | 8, 470 | 46, 650 | 1, 278 | | | | 902 | 259, 830 |
| Platts Bank | 5, 064 | 83, 610 | 522 | | | | 2, 021 | 298, 563 |
| Jeffreys Ledge | 7, 700 | 122, 080 | 1, 022 | 83 | | | 6, 058 | 621, 475 |
| Middle Bank (Stellwagen) | 11, 805 | 247, 975 | 898 | | | | 3, 863 | 904, 311 |
| Shore, general | 142, 647 | 962, 266 | 7, 381 | 39, 905 | | 35 | 81, 463 | 6, 065, 709 |
| Shore, general (occasional) | 700 | 100 | | 100 | | | | 6, 700 |
| Total | 937, 176 | 3, 787, 520 | 1, 233, 049 | 83, 163 | [2] 6, 623 | [2] 1, 410 | 344, 010 | 55, 214, 633 |
| Hand lines: | | | | | | | | |
| Gulf of St. Lawrence (occasional) | | | | | | 39, 420 | | 39, 420 |
| Cape Shore | 3, 900 | 3, 800 | | | | | 2, 500 | 108, 720 |
| Georges Bank | 18, 045 | 3, 700 | 1, 059 | | | | 2, 365 | 336, 569 |
| Georges Bank (occasional) | 3, 250 | | 132 | | | | 100 | 9, 482 |
| Nantucket Shoals | 3, 310 | 300 | 254 | | | | 2, 280 | 73, 964 |
| Shore, general | 3, 300 | 19, 970 | 108 | | | | 170 | 47, 003 |
| Shore, general (occasional) | | | | | | | | 175 |
| Total | 31, 805 | 27, 770 | 1, 553 | | | 39, 420 | 7, 415 | 615, 333 |

[1] Exclusive of duplication.

[2] Incidental catch.

*Landings by fishing vessels at the three principal New England ports, 1934*—Continued

BY GEAR AND FISHING GROUNDS—Continued

| Gear and fishing grounds | Pollock | Cusk | Halibut | Flounders | Swordfish | Mackerel | Other | Total |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Harpoons: | | | | | | | | |
| Green Bank (occasional) | | | | | 600 | | | 600 |
| Sable Island Bank (Western Bank) | | | | | 25,430 | | 180 | 25,610 |
| Cape Shore | | | | | 231,858 | | 456 | 232,314 |
| Cape Shore (occasional) | | | | | 413 | | | 413 |
| La Have Bank | | | | | 6,904 | | | 6,904 |
| La Have Bank (occasional) | | | | | 275 | | | 275 |
| Browns Bank | | | | | 612,669 | | 181 | 612,850 |
| Browns Bank (occasional) | | | | | 4,852 | | | 4,852 |
| Georges Bank | | | | | 484,553 | | 600 | 485,153 |
| Georges Bank (occasional) | | | | | 4,517 | | | 4,517 |
| South Channel | | | | | 160 | | | 160 |
| Nantucket Shoals | | | | | 19,407 | | | 19,407 |
| South | | | | | 35,075 | | | 35,075 |
| Shore, general | | | | | 23,739 | | 888 | 24,627 |
| Shore, general (occasional) | | | | | 881 | | | 881 |
| Total | | | | | 1,451,333 | | 2,305 | 1,453,638 |

| Gear and fishing grounds | Pollock | Cusk | Halibut | Flounders | Swordfish | Mackerel | Herring | Other | Total |
|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Otter trawls, large: | | | | | | | | | |
| St. Peters Bank | | | 364 | | | | | | 376,104 |
| Gulf of St. Lawrence | | | | 19,275 | | | | 600 | 176,125 |
| Quereau Bank | 121,010 | 5,125 | 28,754 | 358,980 | | | | 7,480 | 14,251,874 |
| Sable Island Bank (Western Bank) | 2,127,961 | 13,945 | 336,326 | 2,275,849 | 202 | | | 1,889,761 | 89,128,700 |
| Cape Shore | 625 | 3,125 | | 10,895 | | | | 600 | 132,620 |
| Emerald Bank | 66,600 | | 3,830 | 20,100 | | | | 10,485 | 1,125,565 |
| La Have Bank | 65,850 | 2,340 | 4,476 | 28,400 | | | | 6,610 | 787,631 |
| Browns Bank | 442,185 | 4,220 | 35,475 | 158,566 | | | | 325,335 | 9,633,282 |
| Georges Bank | 526,665 | 25,210 | 54,152 | 674,315 | | 5,285 | | 251,352 | 24,518,514 |
| South Channel | 110,520 | 1,920 | 13,741 | 171,990 | | 400 | | 81,820 | 5,407,401 |
| Middle Bank (Stellwagen) | 2,500 | | 172 | 3,986 | | | | 800 | 329,058 |
| Shore, general | 117,100 | 300 | 5,310 | 88,125 | | | | 31,070 | 2,045,855 |
| Total | 3,581,016 | 56,185 | 482,600 | 3,810,481 | 202 | 5,685 | | 2,605,913 | 147,912,729 |
| Otter trawls, medium: | | | | | | | | | |
| Quereau Bank | 3,850 | | | 4,100 | | | | 22,100 | 216,509 |
| Sable Island Bank (Western Bank) | 80,440 | 1,750 | 12,600 | 111,535 | | | | 90,595 | 5,251,525 |
| Sable Island Bank (Western Bank) (occasional) | | | 383 | 1,800 | | | | 1,800 | 23,783 |
| Cape Shore | 2,760 | | 260 | 5,860 | | | | 18,015 | 215,590 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Emerald Bank | 12,400 | 120 | 291 | 17,090 | | | | 1,550 | 173,991 |
| La Have Bank | 4,175 | 100 | 426 | 1,850 | | | | 770 | 141,366 |
| Browns Bank | 121,500 | 21,585 | 7,347 | 63,630 | | | | 57,349 | 3,013,801 |
| Georges Bank | 260,150 | 2,660 | 22,926 | 1,153,730 | 5,005 | 1,070 | | 323,946 | 11,906,897 |
| South Channel | 79,175 | 550 | 10,087 | 473,735 | | 400 | | 113,952 | 6,287,937 |
| South Channel (occasional) | 200 | | 162 | 1,350 | | | | 900 | 40,412 |
| Off Highland Light | 158,520 | | | 25,360 | | 75 | | 254,315 | 548,175 |
| Off Chatham | 57,520 | | 195 | 86,295 | | | | 317,972 | 1,395,734 |
| Nantucket Shoals | 1,500 | | 25 | 21,370 | | | | 3,375 | 234,620 |
| Cashes Bank | 29,500 | | | 705 | | | | 360 | 47,920 |
| Middle Bank (Stellwagen) | 4,500 | 11,045 | | 19,380 | | | | 5,345 | 68,685 |
| Shore, general | 3,967,525 | 2,965 | 3,142 | 1,783,119 | | 1,945 | | 919,125 | 8,346,039 |
| Total | 4,783,715 | 40,775 | 57,844 | 3,770,909 | [2] 5,005 | [2] 3,490 | | 2,131,469 | 37,913,425 |
| Otter trawls, small: | | | | | | | | | |
| Sable Island Bank (Western Bank) | | 40 | | 3,840 | | | | 325 | 4,950 |
| Georges Bank | 200 | | | 4,235 | | | | | 30,510 |
| South Channel | | | | 3,900 | | | | | 86,825 |
| Off Highland Light | 400 | | 34 | 670 | | | | 420 | 4,784 |
| Nantucket Shoals | 80 | | | | | | | | 6,780 |
| Shore, general | 447,672 | 6,051 | 10,760 | 3,952,001 | | 210 | | 946,376 | 8,489,358 |
| Shore, general (occasional) | | | | 4,000 | | | | | 4,000 |
| Total | 448,352 | 6,091 | 10,794 | 3,968,646 | | [2] 210 | | 947,121 | 8,627,207 |
| Sink gill nets: | | | | | | | | | |
| Jeffreys Ledge | 18,365 | | | | | | | 435 | 22,064 |
| Shore, general | 10,985,140 | 7,060 | 26 | 4,950 | | 9 | | 41,556 | 18,448,531 |
| Total | 11,003,505 | 7,060 | 26 | 4,950 | | [2] 9 | | 41,991 | 18,470,595 |
| Drift gill nets: | | | | | | | | | |
| Bay of Islands | | | | | | | 196,650 | | 196,650 |
| Off Newfoundland (Treaty Coast) | | | | | | | 196,650 | | 196,650 |
| Gulf of St. Lawrence (occasional) | | | | | | 62,910 | | | 62,910 |
| Shore, general | | | | | | 145,810 | | 1,915 | 147,725 |
| Shore, general (occasional) | | | | | | 670 | | | 670 |
| Total | | | | | | 209,390 | 393,300 | 1,915 | 604,605 |
| Purse seines: | | | | | | | | | |
| Sable Island Bank (Western Bank) | | | | | | 12,400 | | | 12,400 |
| Georges Bank | | | | | | 6,625 | | | 6,625 |
| South Channel | | | | | | 1,108,150 | | | 1,108,540 |
| Off Highland Light | | | | | | 35,110 | | | 35,110 |
| Off Chatham | | | | | | 334,150 | | | 334,150 |
| Nantucket Shoals | | | | | | 70,950 | | | 70,950 |

[2] Incidental catch.

*Landings by fishing vessels at the three principal New England ports, 1934*—Continued

BY GEAR AND FISHING GROUNDS—Continued

| Gear and fishing grounds | Pollock | Cusk | Halibut | Flounders | Swordfish | Mackerel | Herring | Other | Total |
|---|---|---|---|---|---|---|---|---|---|
| Purse seines—Continued. | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Middle Bank (Stellwagen) | | | | | | 111,880 | | | 111,880 |
| South | | | | | | 877,260 | | | 877,260 |
| Shore, general | 11,660 | | | 6,865 | 330 | 27,893,496 | 395,400 | 534,466 | 28,842,217 |
| Total | [2] 11,660 | | | [2] 6,865 | [2] 330 | 30,450,021 | 395,400 | 534,466 | 31,399,132 |
| Scallop drags: | | | | | | | | | |
| Georges Bank | | | | | | | | 47,088 | 47,088 |
| Georges Bank (occasional) | | | | | | | | 3,645 | 3,645 |
| Total | | | | | | | | 50,733 | 50,733 |
| Grand total | 20,797,229 | 3,925,401 | 1,785,866 | 11,645,014 | 1,463,493 | 30,709,635 | 788,700 | 6,667,338 | 302,262,03 |

NOTE.—The 3 principal New England ports are Boston, and Gloucester, Mass., and Portland, Maine. Otter trawls (including V-D trawls) are classified according to the size of the vessel. The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation. "Occasional" after the name of a bank or ground indicates that the vessel or vessels contributing to the catch as shown fished chiefly with another type of gear. In such cases the number of vessels fishing, number of trips, and number of days absent, are shown under the principal type of gear used.

SUMMARY: BY FISHING GROUNDS

| Fishing grounds | Vessel fishing | Trips | Days absent | Cod | | | Haddock | | Hake | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Large | Market | Scrod | Large | Scrod | Large | Small |
| Off Newfoundland: | | | | | | | | | | |
| Area XIX: | *Number* | *Number* | *Number* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Bay of Islands | 1 | 1 | 28 | | | | | | | |
| Off Newfoundland (Treaty Coast) | 2 | 2 | 59 | 396,300 | 66,462 | 34,157 | | | | |
| Area XX: | | | | | | | | | | |
| Grand Bank | 3 | 5 | 178 | 38,648 | 9,076 | | | | | |
| Green Bank | 2 | 3 | 87 | 47,576 | 3,220 | | | | 16,891 | |
| St. Peters Bank | 5 | 6 | 84 | 54,500 | 142,390 | | 182,450 | 10,400 | | |
| Total | [1] 12 | 17 | 436 | 537,024 | 221,148 | 34,157 | 182,450 | 10,400 | 16,891 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Off Canada: | | | | | | | | | | |
| Area XIX: | | | | | | | | | | |
| Gulf of St. Lawrence | 6 | 9 | 298 | 1,361,395 | 1,191,898 | 352,632 | 46,880 | 21,000 | 96,635 | ---------- |
| Area XXI: | | | | | | | | | | |
| Quereau Bank | 55 | 132 | 1,814 | 1,405,420 | 5,570,880 | 61,885 | 1,745,815 | 5,498,040 | 72,065 | ---------- |
| Sable Island Bank (Western Bank) | 103 | 742 | 9,085 | 15,041,897 | 20,931,309 | 29,340 | 25,692,493 | 31,473,328 | 580,580 | 31,600 |
| Cape Shore | 70 | 128 | 2,167 | 790,690 | 1,330,528 | 400 | 1,448,320 | 409,975 | 320,139 | ---------- |
| Emerald Bank | 9 | 13 | 145 | 204,565 | 344,035 | 190 | 431,100 | 175,770 | 11,430 | ---------- |
| La Have Bank | 39 | 65 | 772 | 880,836 | 1,120,787 | 3,925 | 1,052,765 | 397,045 | 109,675 | ---------- |
| Roseway Bank | 5 | 5 | 52 | 75,900 | 106,600 | ---------- | 55,000 | 18,300 | 9,480 | ---------- |
| Browns Bank | 130 | 422 | 5,244 | 4,773,889 | 5,147,807 | 5,550 | 10,649,727 | 4,132,502 | 504,850 | 6,500 |
| Area XXII: | | | | | | | | | | |
| Bay of Fundy | 3 | 4 | 16 | 5,340 | 2,817 | ---------- | 260 | ---------- | 16,105 | ---------- |
| Total | [1] 166 | 1,520 | 19,593 | 24,539,932 | 35,746,661 | 453,922 | 41,122,360 | 42,125,960 | 1,720,959 | 38,100 |
| Off United States: | | | | | | | | | | |
| Area XXII: | | | | | | | | | | |
| Georges Bank | 157 | 693 | 7,780 | 5,718,485 | 6,120,116 | 106,885 | 16,263,870 | 8,522,745 | 257,080 | 1,850 |
| South Channel | 128 | 417 | 3,281 | 2,063,115 | 2,044,250 | 15,650 | 10,080,240 | 2,154,945 | 391,433 | 3,350 |
| Off Highland Light | 20 | 31 | 180 | 20,710 | 15,745 | ---------- | 193,510 | 16,225 | 24,895 | 2,400 |
| Off Chatham | 36 | 75 | 457 | 91,740 | 332,982 | 1,960 | 603,700 | 73,900 | 37,610 | 800 |
| Nantucket Shoals | 15 | 23 | 212 | 57,980 | 89,280 | ---------- | 118,640 | 32,600 | 14,700 | ---------- |
| Grand Manan | 1 | 1 | 8 | 3,065 | 1,105 | ---------- | ---------- | 985 | 755 | ---------- |
| Bank Comfort | 1 | 1 | 2 | 545 | 100 | ---------- | 417 | ---------- | 4,850 | ---------- |
| Cashes Bank | 27 | 92 | 513 | 290,917 | 185,935 | 2,930 | 389,945 | 32,930 | 536,830 | 47,545 |
| Fippenies Bank | 13 | 16 | 85 | 42,050 | 19,970 | 530 | 81,235 | 3,655 | 47,780 | 7,310 |
| Platts Bank | 12 | 37 | 77 | 42,320 | 17,115 | 1,287 | 73,383 | 1,906 | 69,360 | 1,975 |
| Jeffreys Ledge | 20 | 100 | 215 | 73,370 | 31,342 | 1,360 | 222,735 | 3,715 | 152,104 | 3,170 |
| Middle Bank (Stellwagen) | 25 | 85 | 413 | 83,155 | 47,615 | 950 | 558,640 | 123,000 | 176,425 | ---------- |
| Shore, general | 293 | 9,182 | 19,010 | 8,641,211 | 1,864,650 | 33,950 | 4,090,463 | 691,487 | 2,856,005 | 691,982 |
| Area XXIII: | | | | | | | | | | |
| South | 25 | 33 | 179 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- |
| Total | [1] 378 | 10,786 | 32,412 | 17,128,663 | 10,770,205 | 165,442 | 32,676,778 | 11,658,093 | 4,569,827 | 760,382 |
| Grand total | [1] 393 | 12,323 | 52,441 | 42,205,619 | 46,738,014 | 653,521 | 73,981,588 | 53,794,453 | 6,307,677 | 798,482 |

[1] Exclusive of duplication.
[2] Incidental catch.

*Landings by fishing vessels at the three principal New England ports, 1934*—Continued

SUMMARY: BY FISHING GROUNDS—Continued

| Fishing grounds | Pollock | Cusk | Halibut | Flounders | Swordfish | Mackerel | Herring | Other | Total |
|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Off Newfoundland: | | | | | | | | | |
| Area XIX: | | | | | | | | | |
| Bay of Islands | | | | | | | 196, 650 | | 196, 650 |
| Off Newfoundland (Treaty Coast) | | | | | | | 196, 650 | | 693, 569 |
| Area XX: | | | | | | | | | |
| Grand Bank | | 945 | 89, 264 | | | | | | 137, 933 |
| Green Bank | | 760 | 127, 075 | | 1, 315 | | | | 196, 837 |
| St. Peters Bank | | | 98, 671 | | | | | | 488, 411 |
| Total | | 1, 705 | 315, 010 | | 1, 315 | | 393, 300 | | 1, 713, 400 |
| Off Canada: | | | | | | | | | |
| Area XIX: | | | | | | | | | |
| Gulf of St. Lawrence | 165 | | 16, 256 | 23, 960 | | 102, 330 | | 600 | 3, 213, 751 |
| Area XXI: | | | | | | | | | |
| Quereau Bank | 126, 040 | 48, 725 | 310, 657 | 363, 080 | 180 | | | 29, 580 | 15, 232, 367 |
| Sable Island Bank (Western Bank) | 2, 275, 875 | 104, 712 | 506, 657 | 2, 397, 274 | 25, 759 | 12, 400 | | 1, 985, 371 | 101, 088, 595 |
| Cape Shore | 63, 360 | 280, 365 | 10, 930 | 20, 380 | 232, 271 | | | 75, 566 | 4, 982, 924 |
| Emerald Bank | 79, 000 | 120 | 4, 121 | 37, 190 | | | | 12, 035 | 1, 299, 556 |
| La Have Bank | 107, 605 | 134, 305 | 139, 463 | 33, 200 | 9, 104 | | | 14, 085 | 4, 002, 795 |
| Roseway Bank | 2, 540 | 27, 480 | 1, 375 | | | | | 7, 380 | 304, 055 |
| Browns Bank | 791, 154 | 861, 330 | 241, 603 | 235, 496 | 620, 222 | | | 490, 851 | 28, 461, 481 |
| Area XXII. | | | | | | | | | |
| Bay of Fundy | 680 | 56, 087 | | | | | | | 81, 289 |
| Total | 3, 446, 419 | 1, 513, 124 | 1, 231, 062 | 3, 110, 580 | 887, 536 | 114, 730 | | 2, 615, 468 | 158, 666, 813 |
| Off United States: | | | | | | | | | |
| Area XXII: | | | | | | | | | |
| Georges Bank | 874, 817 | 179, 315 | 154, 386 | 1, 840, 855 | 494, 625 | 12, 980 | | 633, 931 | 41, 181, 940 |
| South Channel | 410, 055 | 82, 515 | 46, 877 | 653, 945 | 585 | 1, 110, 325 | | 231, 737 | 19, 289, 022 |
| Off Highland Light | 162, 690 | 9, 550 | 810 | 26, 030 | | 35, 185 | | 255, 580 | 763, 330 |
| Off Chatham | 66, 220 | 2, 190 | 1, 263 | 88, 990 | | 334, 150 | | 342, 722 | 1, 978, 167 |
| Nantucket Shoals | 5, 795 | 3, 000 | 279 | 21, 370 | 19, 407 | 70, 950 | | 5, 855 | 439, 856 |
| Grand Manan | 3, 335 | 5, 015 | 79 | | | | | | 14, 339 |
| Bank Comfort | 100 | 6, 625 | | | | | | | 12, 637 |
| Cashes Bank | 93, 650 | 612, 350 | 5, 481 | 730 | | | | 5, 592 | 2, 204, 835 |
| Fippenies Bank | 8, 470 | 46, 650 | 1, 278 | | | | | 902 | 259, 830 |
| Platts Bank | 5, 064 | 83, 610 | 522 | | | | | 2, 021 | 298, 563 |
| Jeffreys Ledge | 26, 065 | 122, 080 | 1, 022 | 83 | | | | 6, 493 | 643, 539 |
| Middle Bank (Stellwagen) | 18, 805 | 259, 020 | 1, 070 | 23, 366 | | 111, 880 | | 10, 008 | 1, 413, 934 |
| Shore, general | 15, 675, 744 | 998, 652 | 26, 727 | 5, 879, 065 | 24, 950 | 28, 042, 175 | 395, 400 | 2, 557, 029 | 72, 469, 490 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Area XXIII: | | | | | | | | | |
| South | | | | | 35,075 | 877,260 | | | 912,335 |
| Total | 17,350,810 | 2,410,572 | 239,794 | 8,534,434 | 574,642 | 30,594,905 | 395,400 | 4,051,870 | 141,881,817 |
| Grand total | 20,797,229 | 3,925,401 | 1,785,866 | 11,645,014 | 1,463,493 | 30,709,635 | 788,700 | 6,667,338 | 302,262,030 |

NOTE.—The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. The roman numerals appearing in the stub of the above table refer to the numbers given these regions by the North American Council on Fishery Investigations.

*Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Maine, 1934*

| Fishing grounds | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off Newfoundland: | | | | | | | | | | | | | |
| Area XIX: | | | | | | | | | | | | | |
| Bay of Islands | | | | | | | | | | | | 28 | 28 |
| Off Newfoundland (Treaty Coast) | | | | | | | | | | 31 | | 28 | 59 |
| Area XX: | | | | | | | | | | | | | |
| Grand Bank | | | 36 | | 86 | | 56 | | | | | | 178 |
| Green Bank | | | | | | 30 | | | 30 | 27 | | | 87 |
| St. Peters Bank | | 21 | 22 | | | 2 | | | | 24 | | 15 | 84 |
| Total | | 21 | 58 | | 86 | 32 | 56 | | 30 | 82 | | 71 | 436 |
| Off Canada: | | | | | | | | | | | | | |
| Area XIX: Gulf of St. Lawrence | | | | | | 18 | 73 | 116 | 34 | 33 | 24 | | 298 |
| Area XXI: | | | | | | | | | | | | | |
| Quereau Bank | | | 34 | 17 | 40 | 71 | 36 | 101 | 132 | 308 | 249 | 816 | 1,804 |
| Sable Island Bank (Western Bank) | 474 | 860 | 1,084 | 1,544 | 1,076 | 688 | 948 | 705 | 547 | 83 | 562 | 509 | 9,080 |
| Cape Shore | 98 | 79 | 47 | 11 | 97 | 130 | 58 | 385 | 608 | 30 | 336 | 288 | 2,167 |
| Emerald Bank | | 4 | | 13 | | | | | | | 20 | 112 | 149 |
| La Have Bank | 250 | 34 | 28 | 34 | | | 82 | 64 | 72 | 57 | 53 | 97 | 771 |
| Roseway Bank | 9 | | | | 9 | | | | 9 | | 15 | 10 | 52 |
| Browns Bank | 582 | 562 | 442 | 419 | 490 | 231 | 785 | 663 | 446 | 200 | 97 | 318 | 5,235 |
| Area XXII: Bay of Fundy | | | 7 | 9 | | | | | | | | | 16 |
| Total | 1,413 | 1,539 | 1,642 | 2,047 | 1,712 | 1,138 | 1,982 | 2,034 | 1,848 | 711 | 1,356 | 2,150 | 19,572 |

*Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Maine, 1934*—Continued

| Fishing grounds | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Off United States: | | | | | | | | | | | | | |
| Area XXII: | | | | | | | | | | | | | |
| Georges Bank | 341 | 696 | 602 | 190 | 610 | 740 | 1,346 | 781 | 838 | 817 | 466 | 361 | 7,788 |
| South Channel | 133 | 95 | 346 | 96 | 254 | 626 | 438 | 521 | 442 | 218 | 84 | 36 | 3,289 |
| Off Highland Light | 48 | 10 | 27 | 13 | | 3 | | 7 | 8 | 32 | 24 | 8 | 180 |
| Off Chatham | 33 | 18 | | 24 | 18 | 40 | 127 | 60 | 71 | 34 | 16 | 16 | 457 |
| Nantucket Shoals | 19 | 7 | | | 13 | 27 | 43 | 38 | 30 | 35 | | | 212 |
| Grand Manan | | | | | 8 | | | | | | | | 8 |
| Bank Comfort | | | | | | | 2 | | | | | | 2 |
| Cashes Bank | 33 | 9 | 43 | 35 | 29 | 12 | 44 | 39 | 24 | 107 | 111 | 27 | 513 |
| Fippenies Bank | 26 | 8 | 8 | 5 | | | | | 8 | 14 | 12 | 4 | 85 |
| Platts Bank | 12 | 28 | 13 | | | | | | | 2 | 8 | 14 | 77 |
| Jeffreys Ledge | 72 | 26 | 20 | | | | | | 4 | | 44 | 49 | 215 |
| Middle Bank (Stellwagen Bank) | 132 | 51 | 88 | 28 | 5 | 2 | 7 | 14 | | 31 | 21 | 34 | 413 |
| Shore, general | 967 | 478 | 1,362 | 1,571 | 1,846 | 1,825 | 1,756 | 2,256 | 2,204 | 1,696 | 1,869 | 1,185 | 19,015 |
| Area XXIII: South | | | | 6 | 113 | 60 | | | | | | | 179 |
| Total | 1,816 | 1,426 | 2,509 | 1,968 | 2,896 | 3,335 | 3,763 | 3,716 | 3,629 | 2,986 | 2,655 | 1,734 | 32,433 |
| Grand total | 3,229 | 2,986 | 4,209 | 4,015 | 4,694 | 4,505 | 5,801 | 5,750 | 5,507 | 3,779 | 4,011 | 3,955 | 52,441 |

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

## MACKEREL FISHERY OF THE ATLANTIC COAST [6]

In 1934 the mackerel fleet landed 40,385,700 pounds of mackerel, an increase of 37 percent as compared with corresponding statistics for the previous year. In 1934, as in the previous year, fleet activity was curtailed for a portion of the season to avoid glutting the market. The curtailment, applying only to purse-seine vessels, was by mutual agreement during the period from May 27 to June 9 and thereafter by authority of the Code of Fair Competition for the Mackerel Fishing Industry under the National Recovery Administration, and consisted of the restrictions indicated in the footnotes of the following table. Unlike 1933, "dumping" of mackerel for lack of market was negligible in 1934.

Of the total landings, 20,253,000 pounds consisted of tinker sizes (under 1 pound each) and 20,132,700 pounds were of larger sizes. Practically all of the tinker mackerel were taken in the Gulf of Maine after July 15. There were no bull's-eye mackerel landed by the fleet.

*Mackerel fishery of the Atlantic coast, 1934*

CATCH: BY AREAS IN 7-DAY PERIODS

| Date | Southern (area XXIII) | | Block Island (area XXII, west of Nantucket Shoals) | | Gulf of Maine (area XXII, north of Nantucket Shoals) | | Total |
|---|---|---|---|---|---|---|---|
| | Seiners | Netters | Seiners | Netters | Seiners | Netters | |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Apr. 8–14 | 2,200 | | | | | | 2,200 |
| Apr. 15–21 | 1,027,500 | 9,500 | | | | | 1,037,000 |
| Apr. 22–28 | 357,600 | 48,200 | | | | | 405,800 |
| Apr. 29–May 5 | 697,100 | 174,500 | | | | | 871,600 |
| May 6–12 | 1,966,300 | 67,400 | | | | | 2,033,700 |
| May 13–19 | 553,600 | 174,100 | 627,800 | | | | 1,355,500 |
| May 20–26 | | 4,000 | 1,471,100 | 127,000 | | 800 | 1,602,900 |
| May 27–June 2 [1] | | | 1,634,700 | 22,000 | | 28,200 | 1,684,900 |
| June 3–9 [2] | | | 708,200 | 36,000 | | 1,200 | 745,400 |
| June 10–16 [3] | | | 366,100 | 8,600 | 83,200 | 9,400 | 466,700 |
| June 17–23 [3] | | | 534,300 | 4,000 | 192,800 | 21,900 | 753,000 |
| June 24–30 [4] | | | 803,100 | 4,000 | 489,600 | 34,800 | 1,331,500 |
| July 1–7 [4] | | | 47,800 | | 1,044,200 | 11,800 | 1,103,800 |
| July 8–14 [4] | | | | | 1,275,000 | 7,500 | 1,282,500 |
| July 15–21 [4] | | | 7,300 | | 1,153,200 | 11,200 | 1,171,700 |
| July 22–28 [4] | | | | | 1,469,900 | 800 | 1,470,700 |
| July 29–Aug 4 [4] | | | | | 1,174,600 | | 1,174,600 |
| Aug. 5–11 | | | | | 1,801,500 | 1,000 | 1,802,500 |
| Aug. 12–18 | | | | | 2,483,800 | 800 | 2,484,600 |
| Aug. 19–25 | | | | | 2,253,500 | | 2,253,500 |
| Aug. 26–Sept. 1 | | | | | 3,695,100 | | 3,695,100 |
| Sept. 2–8 | | | | | 2,395,800 | | 2,395,800 |
| Sept. 9–15 | | | | | 2,431,400 | | 2,431,400 |
| Sept. 16–22 | | | | | 2,420,300 | | 2,420,300 |
| Sept. 23–29 | | | | | 1,986,100 | | 1,986,100 |
| Sept. 30–Oct. 6 | | | | | 951,400 | | 951,400 |
| Oct. 7–13 | | | | | 967,200 | | 967,200 |
| Oct. 14–20 | | | | | 323,600 | 1,000 | 324,600 |

[1] Each vessel limited to 28,000 pounds per trip.

[2] Each vessel limited to 28,000 pounds per trip and fleet called into port June 5 to avoid further glutting of the market.

[3] One-half of fleet operated, each vessel of 20 tons gross or over subject to a limit of 5,000 pounds plus 1,000 pounds per member of crew plus 50 pounds pergross ton (average 20,300 pounds per vessel) per trip and each boat under 20 gross tons subject to a limit of 5,000 pounds plus 1,000 pounds per member of crew (average 13,000 pounds per boat) per trip.

[4] Entire fleet operated subject to same trip limit with 1 trip limit allowed per week and unfilled trip limits applied to following weeks' quotas.

[6] This section, prepared by O. E. Sette of the Division of Scientific Inquiry, includes the landings at Cape May and Wildwood, N. J.; New York, N. Y.; Newport, R. I.; New Bedford, Woods Hole, Provincetown, Boston, and Gloucester, Mass.; and Portland and Boothbay Harbor, Maine, by purse-seine vessels, "seiners", and drift-gill-net vessels, "netters"; and such boats as fish by the same methods and on the same grounds as the vessels. It does not include the catch of the smaller boats or the catch by other forms of gear.

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

*Mackerel fishery of the Atlantic coast, 1934*—Continued

CATCH: BY AREAS IN 7-DAY PERIODS—Continued

| Date | Southern (area XXIII) | | Block Island (area XXII, west of Nantucket Shoals) | | Gulf of Maine (area XXII, north of Nantucket Shoals) | | Total |
|---|---|---|---|---|---|---|---|
| | Seiners | Netters | Seiners | Netters | Seiners | Netters | |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Oct. 21–27 | | | | | 42,800 | | 42,800 |
| Oct. 28–Nov. 3 | | | | | 8,000 | 100 | 8,100 |
| Nov. 4–10 | | | | | 3,900 | 5,400 | 9,300 |
| Nov. 11–17 | | | | | | 22,600 | 22,600 |
| Nov. 18–24 | | | | | 5,200 | 36,600 | 41,800 |
| Nov. 25–Dec. 1 | | | | | | 41,500 | 41,500 |
| Dec. 2–8 | | | | | | 12,800 | 12,800 |
| Dec. 9–15 | | | | | | 300 | 300 |
| Dec. 16–22 | | | | | | 500 | 500 |
| Total | 4,604,300 | 477,700 | 6,200,400 | 201,000 | 28,652,100 | 250,200 | 40,385,700 |

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS

| Designation | Vessels and boats | Tonnage | Crew | Trips | Total catch |
|---|---|---|---|---|---|
| SOUTHERN—AREA XXIII | | | | | |
| Seiners: | *Number* | *Net tons* | *Number* | *Number* | *Pounds* |
| Regular vessels | 42 | 1,695 | 544 | 200 | 4,215,600 |
| Miscellaneous vessels | 9 | 339 | 100 | 21 | 388,700 |
| Netters: | | | | | |
| Regular vessels | 11 | 187 | 75 | 65 | 446,600 |
| Miscellaneous vessels | 2 | 21 | 11 | 4 | 24,500 |
| Miscellaneous boats | 1 | | | 2 | 6,600 |
| Total | [5] 64 | 2,242 | 730 | 292 | 5,082,000 |
| BLOCK ISLAND—AREA XXII | | | | | |
| (West of Nantucket Shoals only) | | | | | |
| Seiners: | | | | | |
| Regular vessels | 55 | 2,138 | 688 | 287 | 6,010,200 |
| Miscellaneous vessels | 10 | 227 | 99 | 17 | 190,200 |
| Netters: | | | | | |
| Regular vessels | 12 | 201 | 81 | 26 | 188,000 |
| Miscellaneous vessels | 3 | 22 | 13 | 3 | 9,600 |
| Miscellaneous boats | 1 | | | 1 | 3,400 |
| Total | [5] 80 | 2,588 | 881 | 334 | 6,401,400 |
| GULF OF MAINE—AREA XXII | | | | | |
| (North of Nantucket Shoals only) | | | | | |
| Seiners: | | | | | |
| Regular vessels | 69 | 2,210 | 676 | 1,525 | 26,675,100 |
| Miscellaneous vessels | 21 | 356 | 169 | 89 | 1,055,800 |
| Miscellaneous boats | 18 | | | 149 | 921,200 |
| Netters: | | | | | |
| Spring and summer: | | | | | |
| Miscellaneous vessels | 5 | 53 | 26 | 14 | 24,500 |
| Miscellaneous boats | 22 | | | 74 | 104,900 |
| Fall: | | | | | |
| Regular vessels | 12 | 322 | 93 | 82 | 95,900 |
| Miscellaneous vessels | 5 | 166 | 40 | 6 | 16,200 |
| Miscellaneous boats | 5 | | | 18 | 8,700 |
| Total | [5] 100 | 3,107 | 1,004 | 1,957 | 28,902,300 |
| Total seiners | [5] 92 | | | 2,288 | 39,456,800 |
| Total netters | [5] 32 | | | 295 | 928,900 |
| Grand total | [5] 112 | | | 2,583 | 40,385,700 |

[5] Exclusive of duplication and of boats.

## FISHERIES OF THE MIDDLE ATLANTIC STATES

(Area XXIII) [7]

The most recent complete fishery statistics for the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) are those collected for the year 1933. In that year the yield of the commercial fisheries amounted to 169,753,735 pounds, valued at $4,811,055 to the fishermen, representing an increase of 20 percent in volume and 3 percent in value as compared with the catch of the previous year. Detailed statistics of these fisheries for 1933 appear in "Fishery industries of the United States, 1934", Appendix II to the Report of the United States Commissioner of Fisheries, 1935. A summary of these fisheries as well as statistics of the shad fishery of the Hudson River for 1934 appear in the following tables.

*Fisheries of the Middle Atlantic States, 1933*

OPERATING UNITS: By States

| Item | New York | New Jersey | Pennsylvania | Delaware | Total |
|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | |
| On vessels | 825 | 1,267 | | 350 | 2,442 |
| On boats and shore: | | | | | |
| Regular | 1,509 | 954 | | 34 | 2,497 |
| Casual | 1,482 | 1,622 | 53 | 478 | 3,635 |
| Total | 3,816 | 3,843 | 53 | 862 | 8,574 |
| Vessels: | | | | | |
| Steam | 9 | | | 10 | 19 |
| Net tonnage | 1,773 | | | 1,237 | 3,010 |
| Motor | 160 | 208 | | 16 | 384 |
| Net tonnage | 2,422 | 3,470 | | 229 | 6,121 |
| Sail | | 3 | | 1 | 4 |
| Net tonnage | | 24 | | 8 | 32 |
| Total vessels | 169 | 211 | | 27 | 407 |
| Total net tonnage | 4,195 | 3,494 | | 1,474 | 9,163 |
| Boats: | | | | | |
| Motor | 636 | 1,029 | 5 | 77 | 1,747 |
| Other | 1,188 | 740 | 14 | 181 | 2,123 |
| Accessory boats | 39 | 88 | | 30 | 157 |
| Apparatus: | | | | | |
| Purse seines: | | | | | |
| Menhaden | | 8 | | 10 | 18 |
| Length, yards | | 2,806 | | 3,140 | 5,946 |
| Other | 2 | 7 | | | 9 |
| Length, yards | 800 | 2,510 | | | 3,310 |
| Haul seines | 71 | 105 | 12 | 61 | 249 |
| Length, yards | 5,926 | 9,040 | 1,635 | 18,990 | 35,591 |
| Gill nets: | | | | | |
| Anchor | 46 | 10 | | | 56 |
| Square yards | 40,832 | 5,830 | | | 46,662 |
| Drift | 254 | 605 | 7 | 63 | 929 |
| Square yards | 423,369 | 448,333 | 5,200 | 145,720 | 1,022,622 |
| Runaround | 43 | 69 | | 33 | 145 |
| Square yards | 124,822 | 210,695 | | 41,450 | 376,967 |
| Stake | 49 | 251 | | 99 | 399 |
| Square yards | 23,161 | 46,882 | | 7,770 | 77,813 |
| Lines: | | | | | |
| Hand | 225 | 463 | | 12 | 700 |
| Hooks | 441 | 720 | | 24 | 1,185 |
| Trawl | 693 | 712 | | 2 | 1,407 |
| Hooks | 187,600 | 420,400 | | 1,300 | 609,300 |

[7] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included in this area craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery which extends into area XXIV. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

*Fisheries of the Middle Atlantic States, 1933*—Continued

OPERATING UNITS: BY STATES—Continued

| Item | New York | New Jersey | Pennsylvania | Delaware | Total |
|---|---|---|---|---|---|
| Apparatus—Continued. | | | | | |
| Lines—Continued. | *Number* | *Number* | *Number* | *Number* | *Number* |
| Troll | 20 | 404 | | | 424 |
| Hooks | 20 | 404 | | | 424 |
| Trot with baits or snoods | | 9 | | | 9 |
| Baits or snoods | | 9,900 | | | 9,900 |
| Trot with hooks | 14 | | | | 14 |
| Hooks | 1,495 | | | | 1,495 |
| Pound nets | 301 | 153 | | 32 | 486 |
| Weirs | | 88 | | | 88 |
| Stop nets | 24 | 65 | | 7 | 96 |
| Square yards | 11,258 | 50,615 | | 1,820 | 63,693 |
| Fyke nets | 849 | 1,369 | | 449 | 2,667 |
| Dip nets | 5 | 34 | | 51 | 90 |
| Cast nets | | 3 | | | 3 |
| Scap nets | 279 | | | | 279 |
| Drag nets | 47 | 14 | | | 61 |
| Yards at mouth | 94 | 28 | | | 122 |
| Otter trawls | 130 | 67 | | | 197 |
| Yards at mouth | 2,791 | 1,514 | | | 4,305 |
| Wire baskets | | 12 | | | 12 |
| Pots: | | | | | |
| Crab | | 10 | | | 10 |
| Eel | 3,877 | 2,571 | | 876 | 7,324 |
| Lobster | 18,340 | 28,071 | | 165 | 46,576 |
| Harpoons | 18 | 1 | | | 19 |
| Spears | 77 | 92 | | | 169 |
| Dredges: | | | | | |
| Clam | 14 | 43 | | 33 | 90 |
| Yards at mouth | 12 | 48 | | 47 | 107 |
| Crab | 6 | 69 | | 11 | 86 |
| Yards at mouth | 14 | 90 | | 20 | 124 |
| Mussel | 2 | | | | 2 |
| Yards at mouth | 2 | | | | 2 |
| Oyster | 78 | 259 | | 16 | 353 |
| Yards at mouth | 115 | 309 | | 23 | 447 |
| Scallop | 250 | 10 | | | 260 |
| Yards at mouth | 365 | 34 | | | 399 |
| Tongs | 837 | 783 | | 32 | 1,652 |
| Rakes | 568 | 509 | | | 1,077 |
| Forks | 271 | 51 | | | 322 |
| Hoes | | 176 | | | 176 |
| Gaffs | | 2 | | | 2 |

*Fisheries of the Middle Atlantic States, 1933*—Continued

CATCH: BY STATES [1]

| Species | New York | | New Jersey | | Pennsylvania | | Delaware | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 218,257 | $5,023 | 13,990 | $244 | 8,775 | $88 | 1,148,980 | $4,786 | 1,390,002 | $10,141 |
| Bluefish | 1,131,721 | 56,097 | 2,115,304 | 76,146 | | | 4,720 | 236 | 3,251,745 | 132,479 |
| Bonito | 159,007 | 9,541 | 88,407 | 4,103 | | | | | 247,414 | 13,644 |
| Butterfish | 1,498,212 | 61,339 | 2,912,214 | 119,319 | | | | | 4,410,426 | 180,658 |
| Carp | 219,497 | 17,574 | 143,471 | 16,047 | 640 | 64 | 26,420 | 1,589 | 390,028 | 35,274 |
| Catfish and bullheads | 19,008 | 2,561 | 55,380 | 3,321 | | | 1,845 | 116 | 76,233 | 5,998 |
| Cero | | | 2,500 | 75 | | | | | 2,500 | 75 |
| Cod | 4,260,669 | 112,583 | 3,229,886 | 99,688 | | | 2,240 | 69 | 7,492,795 | 212,340 |
| Crevalle | | | 7,254 | 141 | | | | | 7,254 | 141 |
| Croaker | 80,147 | 1,531 | 1,901,073 | 44,945 | | | 67,130 | 1,068 | 2,048,350 | 47,544 |
| Cusk | 3,500 | 99 | | | | | | | 3,500 | 99 |
| Dolphin | | | 111 | 9 | | | | | 111 | 9 |
| Drum: | | | | | | | | | | |
| Black | 447 | 9 | | | | | | | 447 | 9 |
| Red or redfish | | | 8,770 | 126 | | | 520 | 16 | 9,290 | 142 |
| Eels: | | | | | | | | | | |
| Common | 290,470 | 27,446 | 336,466 | 28,565 | | | 53,140 | 3,892 | 680,076 | 59,903 |
| Conger | 5,260 | 257 | 11,163 | 432 | | | | | 16,423 | 689 |
| Flounders | 5,191,128 | 192,032 | 4,051,797 | 170,601 | | | 9,450 | 492 | 9,252,375 | 363,125 |
| Frigate mackerel | 81,886 | 1,234 | 19,754 | 243 | | | | | 101,640 | 1,477 |
| Goosefish | | | 10,000 | 38 | | | | | 10,000 | 38 |
| Grayfish | | | 6,739 | 135 | | | | | 6,739 | 135 |
| Haddock | 8,506,679 | 248,282 | | | | | | | 8,506,679 | 248,282 |
| Hake | 139,954 | 2,811 | 22,171 | 360 | | | | | 162,125 | 3,171 |
| Halibut | 52,508 | 7,280 | | | | | | | 52,508 | 7,280 |
| Herring: | | | | | | | | | | |
| Round | | | 750 | 8 | | | | | 750 | 8 |
| Sea | 74,987 | 610 | 590,465 | 5,171 | | | | | 665,452 | 5,781 |
| Hickory shad | 1,300 | 25 | | | | | | | 1,300 | 25 |
| Kingfish or "king mackerel" | | | 140 | 5 | | | | | 140 | 5 |
| King whiting or "kingfish" | 73,223 | 4,057 | 84,039 | 10,932 | | | | | 157,262 | 14,989 |
| Mackerel | 343,717 | 12,353 | 318,047 | 9,692 | | | | | 661,764 | 22,045 |
| Menhaden | 201,176 | 938 | 45,774,117 | 122,929 | | | 33,600,000 | 111,700 | 79,575,293 | 235,567 |
| Mullet | 2,500 | 96 | 82,747 | 6,234 | | | 233,000 | 2,390 | 318,247 | 8,720 |
| Mummichog | 25,050 | 2,505 | 25,925 | 1,939 | | | | | 50,975 | 4,444 |
| Pigfish | | | 203 | 5 | | | | | 203 | 5 |
| Pike or pickerel | 420 | 53 | | | | | | | 420 | 53 |
| Pollock | 770,231 | 11,551 | 6,280 | 94 | | | | | 776,511 | 11,645 |

[1] Excluding the seed oyster fishery. The seed oyster fishery in New York, New Jersey, and Delaware was prosecuted by 2,034 fishermen who used 153 vessels, 206 motorboats 152 other boats, 300 dredges. 374 tongs, and 79 rakes; 1,027,040 bushels of seed oysters, valued at $270,112 were taken from public beds, while 78,580 bushels, valued at $77,830, were taken from private beds. Of the total number of persons fishing for seed oysters, 1,881 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 87 vessels, 79 motorboats, 92 other boats, 172 dredges, 327 tongs and 15 rakes.

*Fisheries of the Middle Atlantic States, 1933*—Continued

CATCH: BY STATES—Continued

| Species | New York | | New Jersey | | Pennsylvania | | Delaware | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Pompano | | | 317 | $77 | | | | | 317 | $77 |
| Scup or porgy | 1,478,153 | $26,649 | 4,881,364 | 65,293 | | | | | 6,359,517 | 91,942 |
| Sea bass | 505,688 | 23,668 | 1,969,143 | 63,601 | | | | | 2,474,831 | 87,269 |
| Sea robin | 18,758 | 276 | 10,805 | 109 | | | | | 29,563 | 385 |
| Shad | 351,786 | 28,761 | 457,458 | 45,181 | 2,217 | $392 | 22,325 | $1,993 | 833,786 | 76,327 |
| Sharks | 2,500 | 35 | 9,610 | 203 | | | | | 12,110 | 238 |
| Sheepshead | | | 9 | 1 | | | | | 9 | 1 |
| Silversides | 18,500 | 1,838 | 4,830 | 676 | | | | | 23,330 | 2,514 |
| Skates | 725 | 7 | 82,976 | 712 | | | | | 83,701 | 719 |
| Smelts | 245 | 47 | | | | | | | 245 | 47 |
| Spanish mackerel | | | 6,419 | 287 | | | | | 6,419 | 287 |
| Spot | 22,765 | 463 | 473,565 | 6,958 | | | 31,920 | 903 | 528,250 | 8,324 |
| Squeteagues or "sea trout": | | | | | | | | | | |
| Gray | 823,634 | 38,147 | 6,927,381 | 185,597 | | | 123,180 | 3,341 | 7,874,195 | 227,085 |
| Spotted | | | 30 | 2 | | | | | 30 | 2 |
| Squirrel hake | | | 52,765 | 402 | | | | | 52,765 | 402 |
| Striped bass | 18,954 | 2,724 | 9,122 | 1,770 | | | 11,700 | 1,382 | 39,776 | 5,876 |
| Sturgeon | 1,851 | 311 | 26,713 | 2,130 | | | 1,200 | 300 | 29,764 | 2,741 |
| Suckers | 28,624 | 2,365 | 102,575 | 8,462 | 40,600 | 2,436 | | | 171,799 | 13,263 |
| Sunfish | 1,690 | 132 | | | | | | | 1,690 | 132 |
| Swellfish | 2,000 | 200 | | | | | | | 2,000 | 200 |
| Swordfish | 100,966 | 12,441 | 1,600 | 128 | | | | | 102,566 | 12,569 |
| Tautog | 61,158 | 1,584 | 70,923 | 10,048 | | | | | 132,081 | 11,632 |
| Thimble-eyed mackerel | | | 25,475 | 374 | | | | | 25,475 | 374 |
| Tilefish | 1,350,000 | 67,500 | 25 | 1 | | | | | 1,350,025 | 67,501 |
| Tomcod | 7,690 | 338 | | | | | | | 7,690 | 338 |
| Tuna or "horse mackerel" | 6,736 | 270 | 36,492 | 1,656 | | | | | 43,228 | 1,926 |
| Whitebait | 3,000 | 450 | | | | | | | 3,000 | 450 |
| White perch | 15,182 | 1,119 | 29,420 | 2,666 | | | 30,650 | 1,490 | 75,252 | 5,275 |
| Whiting | 106,111 | 1,028 | 2,040,544 | 20,134 | | | 480 | 30 | 2,147,135 | 21,192 |
| Wolffish | 25,625 | 576 | | | | | | | 25,625 | 576 |
| Yellow perch | 1,857 | 168 | | | | | 6,480 | 398 | 8,337 | 566 |
| Total | 28,305,152 | 988,984 | 79,038,724 | 1,138,015 | 52,232 | 2,980 | 35,375,380 | 136,191 | 142,771,488 | 2,266,170 |
| SHELLFISH, ETC. | | | | | | | | | | |
| Crabs: | | | | | | | | | | |
| Hard | 149,383 | 5,437 | 709,410 | 18,356 | | | 96,600 | 1,295 | 955,393 | 25,088 |
| King | | | 2,183,772 | 5,931 | | | 566,600 | 595 | 2,750,372 | 6,526 |
| Soft | 825 | 225 | 57,363 | 12,239 | | | 36,000 | 7,200 | 94,188 | 19,664 |
| Lobsters | 346,496 | 67,256 | 364,220 | 67,629 | | | 12,840 | 2,568 | 723,556 | 137,453 |
| Shrimp | 59,912 | 11,981 | 25,741 | 3,328 | | | | | 85,653 | 15,309 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Squid | 444,938 | 6,696 | 347,312 | 8,760 | | | | | 792,250 | 15,456 |
| Clams: | | | | | | | | | | |
| Hard, public [2] | 1,923,610 | 271,295 | 1,405,204 | 215,579 | | | 191,300 | 30,310 | 3,520,114 | 517,184 |
| Hard, private [2] | 21,040 | 4,601 | 70,461 | 8,721 | | | 9,640 | 1,898 | 101,141 | 15,220 |
| Soft, public [3] | 222,150 | 18,760 | 913,560 | 45,752 | | | | | 1,135,710 | 64,512 |
| Surf or skimmer | 379,500 | 18,380 | 146,313 | 5,732 | | | | | 525,813 | 24,112 |
| Conchs | 35,000 | 2,095 | 54 | 2 | | | | | 35,054 | 2,097 |
| Mussels, sea | 47,400 | 3,150 | 5,200 | 200 | | | | | 52,600 | 3,350 |
| Oysters: [4] | | | | | | | | | | |
| Market, public, spring | 19,250 | 2,662 | 10,966 | 1,138 | | | 39,600 | 5,140 | 69,816 | 8,940 |
| Market, public, fall | 81,984 | 9,512 | 26,606 | 1,792 | | | | | 108,590 | 11,304 |
| Market, private, spring | 2,761,525 | 381,138 | 3,718,539 | 282,883 | | | 24,520 | 2,985 | 6,504,584 | 667,006 |
| Market, private, fall | 3,229,025 | 439,378 | 3,855,564 | 301,288 | | | 165,240 | 20,065 | 7,249,829 | 760,731 |
| Periwinkles and cockles | | | 100 | 2 | | | | | 100 | 2 |
| Scallops: | | | | | | | | | | |
| Bay | 48,000 | 17,100 | 594 | 30 | | | | | 48,594 | 17,130 |
| Sea | 1,823,492 | 193,445 | 373,589 | 22,402 | | | | | 2,197,081 | 215,847 |
| Terrapin, diamond-back | | | 502 | 145 | | | 410 | 260 | 912 | 405 |
| Turtles, snapper | | | 2,500 | 250 | | | 8,504 | 679 | 11,004 | 929 |
| Bloodworms | 9,250 | 8,390 | 1,740 | 1,505 | | | | | 10,990 | 9,895 |
| Sandworms | 3,500 | 2,080 | 5,403 | 4,645 | | | | | 8,903 | 6,725 |
| Total | 11,606,280 | 1,463,581 | 14,224,713 | 1,008,309 | | | 1,151,254 | 72,995 | 26,982,247 | 2,544,885 |
| Grand total | 39,911,432 | 2,452,565 | 93,263,437 | 2,146,324 | 52,232 | 2,980 | 36,526,634 | 209,186 | 169,753,735 | 4,811,055 |

[2] Statistics on hard clams are based on yields of 8 pounds of meats to the bushel in New York, 8.96 in New Jersey, and 10 pounds in Delaware.
[3] Statistics on soft clams used in this table are based on yields of 16 pounds of meats to the bushe lin New York and 20 pounds iu New Jersey.
[4] Statistics on oysters used in this table are based on yields of 7 pounds of meats to the bushel in New York, 8.70 in New Jersey, and 7.88 in Delaware.

NOTE.—Of the total catch in New Jersey, 7,500 pounds of shad, valued at $600, were caught in the St. Johns River in Florida, and 1,447,252 pounds of fishery products, valued at $47,109, were taken in the southern trawl fishery off southern New Jersey, Maryland, Virginia. and North Carolina. Of the total catch in New York, 1,024,291 pounds of fishery products, valued at $35,928, were taken in the southern trawl fishery. The products of the southern trawl fishery consisted principally of croaker, flounders, scup and sea bass.

*Industries related to the fisheries of the Middle Atlantic States*

OPERATING UNITS, SALARIES, AND WAGES, 1933

| Item | New York | New Jersey | Pennsylvania | Delaware | Total |
|---|---|---|---|---|---|
| Transporting: | | | | | |
| Persons engaged: | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 100 | 10 | | | 110 |
| On boats | | 92 | | | 92 |
| Total | 100 | 102 | | | 202 |
| Vessels: | | | | | |
| Motor | 26 | 4 | | | 30 |
| Net tonnage | 580 | 49 | | | 629 |
| Boats | | 87 | | | 87 |
| Wholesale and manufacturing: | | | | | |
| Establishments | 210 | 124 | 49 | 15 | 398 |
| Persons engaged: | | | | | |
| Proprietors | 184 | 116 | 44 | 14 | 358 |
| Salaried employees | 775 | 159 | 113 | 20 | 1,067 |
| Wage earners: | | | | | |
| Average for season | 1,896 | 1,381 | 477 | 452 | 4,206 |
| Average for year | 1,457 | 906 | 396 | 189 | 2,948 |
| Paid to salaried employees | $2,164,542 | $311,040 | $200,846 | $12,460 | $2,688,888 |
| Paid to wage earners | $2,088,832 | $785,657 | $403,433 | $119,171 | $3,397,093 |
| Total salaries and wages | $4,253,374 | $1,096,697 | $604,279 | $131,631 | $6,085,981 |
| Fishermen manufacturing | 348 | 157 | | 7 | 512 |

PRODUCTS MANUFACTURED

| Item | New York | | New Jersey | | Pennsylvania | | Delaware | |
|---|---|---|---|---|---|---|---|---|
| By manufacturing establishments: | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Buffalofish, smoked pounds | 440,000 | $131,750 | | | | | | |
| Butterfish, smoked do | 408,600 | 100,050 | 80,896 | $20,269 | (1) | (1) | | |
| Carp, smoked do | 91,000 | 27,200 | (1) | (1) | | | | |
| Chubs, cisco, lake herring, and tullibee, smoked pounds | 2,495,880 | 534,914 | (1) | (1) | 330,000 | $93,000 | | |
| Cod: | | | | | | | | |
| Fresh fillets [2] do | 2,338,182 | 318,327 | (1) | (1) | | | | |
| Smoked fillets do | 66,305 | 13,700 | (1) | (1) | | | | |
| Flounders, fresh fillets [2] pounds | 1,224,250 | 193,433 | | | | | | |
| Haddock, fresh fillets [2] pounds | 2,077,771 | 285,912 | (1) | (1) | | | | |
| Hake, fresh fillets [2] do | 128,172 | 15,017 | (1) | (1) | | | | |
| Herring, sea: | | | | | | | | |
| Kippered do | 55,100 | 10,210 | (1) | (1) | (3) | (3) | | |
| Bloaters do | (1) | (1) | (1) | (1) | 540,000 | 30,250 | | |
| Lake trout, smoked do | 90,400 | 28,650 | (1) | (1) | (1) | (1) | | |
| Mackerel, smoked do | 77,300 | 13,602 | (1) | (1) | (1) | (1) | | |
| Paddlefish or spoonbill cat, smoked pounds | 338,600 | 155,920 | | | | | | |
| Pollock, fresh fillets [2] pounds | 103,526 | 13,050 | | | | | | |
| Salmon: | | | | | | | | |
| Kippered do | 269,000 | 82,700 | (4) | (4) | (1) | (1) | | |
| Smoked do | 5,427,102 | 1,494,928 | 478,966 | 130,864 | (1) | (1) | | |
| Roe, canned [2] standard cases | 860 | 20,164 | | | | | | |
| Shad, smoked pounds | 149,000 | 30,400 | (1) | (1) | (1) | (1) | | |
| Sturgeon, smoked do | 1,084,000 | 548,660 | 205,987 | 149,781 | (1) | (1) | | |
| Sturgeon, caviar, canned [2] standard cases | 3,126 | 396,824 | | | | | | |
| Whitefish, smoked pounds | 1,104,000 | 297,750 | (1) | (1) | 340,000 | 85,200 | | |
| Whitefish roe and caviar, canned [2] standard cases | 179 | 6,803 | | | | | | |
| Crabs, king, scrap, and meal [2] tons | | | 250 | 9,730 | | | (1) | (1) |
| Clams: | | | | | | | | |
| Hard, fresh shucked gallons | | | 1,875 | 2,723 | 4,110 | 14,495 | | |
| Soft, fresh shucked gallons | | | 16,360 | 14,902 | | | | |
| Marine-shell products: | | | | | | | | |
| Buttons [2] gross | 512,531 | 391,109 | 1,267,703 | 955,660 | (1) | (1) | | |
| Novelties [2] | | 44,066 | | 130,619 | | | | |

See footnotes at end of table.

*Industries related to the fisheries of the Middle Atlantic States*—Continued

PRODUCTS MANUFACTURED—Continued

| Item | New York | | New Jersey | | Pennsylvania | | Delaware | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing establishments—Continued. | | | | | | | | |
| Oysters, fresh shucked gallons | 265,967 | $469,016 | 372,848 | $577,217 | 60,958 | $139,056 | 39,671 | $48,434 |
| Oyster-shell products: | | | | | | | | |
| Poultry feed [2] tons | | | 4,951 | 41,104 | 2,978 | 26,192 | (1) | (1) |
| Lime [2] do | | | 2,083 | 8,986 | 1,169 | 4,208 | (1) | (1) |
| Unclassified products: | | | | | | | | |
| Fillets, fresh and frozen [2] pounds | [5] 245,000 | [5] 52,550 | (6) | (6) | | | | |
| Smoked do | (6) | (6) | [7] 581,349 | [7] 162,675 | (6) | (6) | | |
| Canned [2] standard cases | [8] 8,420 | [8] 88,268 | (6) | (6) | | | | |
| Miscellaneous [9] | | [10] 471,321 | | [11] 1,111,401 | | [12] 702,240 | | [13] 303,208 |
| Total | | 6,236,294 | | 3,315,931 | | 1,094,641 | | 351,642 |
| By fishermen: | | | | | | | | |
| Bluefish, smoked pounds | | | 50 | 2 | | | | |
| Eels: | | | | | | | | |
| Smoked do | 2,150 | 537 | 5,450 | 1,675 | | | | |
| Pickled do | | | 48 | 14 | | | | |
| Herring, sea, smoked pounds | | | 4,900 | 196 | | | | |
| Mackerel, smoked do | | | 100 | 20 | | | | |
| Hake, smoked do | | | 50 | 5 | | | | |
| Whiting, smoked do | | | 50 | 5 | | | | |
| Clams, soft, fresh shucked gallons | | | 6,840 | 5,244 | | | | |
| Scallops: | | | | | | | | |
| Bay, fresh shucked gallons | 5,400 | 17,100 | | | | | | |
| Sea, fresh shucked gallons | 204,555 | 192,647 | 35,603 | 33,813 | | | | |
| Sturgeon roe, salted pounds | | | 50 | 33 | | | | |
| King-crab scrap tons | | | 214 | 6,655 | | | 80 | 2,200 |
| Total | | 210,284 | | 47,662 | | | | 2,200 |
| Grand total | | 6,446,578 | | 3,363,593 | | 1,094,641 | | 353,842 |

[1] The production of this item is included under "Unclassified products."
[2] Data are for 1934.
[3] Kippered sea herring is included with bloaters.
[4] Kippered salmon is included with smoked salmon.
[5] Includes fresh fillets of bluefish, halibut, mackerel, cusk, red snapper, salmon, sea bass, and wolffish.
[6] This has been included under "Miscellaneous."
[7] Includes smoked bluefish, carp, chubs, cisco, cod, eels, flounders, goosefish, haddock, lake trout, mackerel, sea herring (bloaters), shad, tullibee, and whitefish; and kippered sea herring.
[8] Includes canned clam products, pickled eels, terrapin and turtle products, and sea mussels.
[9] Both 1933 and 1934 data are included in these items.
[10] Includes smoked eels, haddock fillets, and sea herring (bloaters); fish meal; cod-liver oil; menhaden oil and meal; and fresh-water mussel-shell products.
[11] Includes canned hard clams and clam chowder, and oysters; shredded salt cod; fresh-cooked crab meat; fresh fillets of cod, hake and haddock; menhaden products; and fresh-water mussel-shell products.
[12] Includes smoked alewives, butterfish, finnan haddie, lake trout, mackerel, salmon, shad and sturgeon; kippered salmon and shad; and marine-shell products.
[13] Includes menhaden products, oyster-shell products, and king-crab scrap.

NOTE.—Unless otherwise indicated the data are for 1933. The total value of products for the Middle Atlantic States was as follows: By manufacturing establishments, $10,998,508; and by fishermen, $260,146. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting craft, 135 have been included as fishermen and among the total number of persons engaged in the preparation of fishermen's prepared products, 511 have been included as fishermen.

## SHAD FISHERY OF THE HUDSON RIVER

The shad fishery of the Hudson River in 1934 was prosecuted by 322 fishermen who used 5 motor boats, 149 other boats, 10 haul seines having a combined length of 1,869 yards, 126 drift gill nets having a total area of 505,050 square yards, 28 stake gill nets having a total area of 27,330 square yards, and 11 fyke nets. The total commercial catch amounted to 141,458 shad having a weight of 438,000 pounds

and a value to the fishermen of $36,074. This is a decrease of 8 percent in the number of shad and 11 percent in their value as compared with 1933. The average price per pound received by the fishermen in both 1934 and 1933 was about 8 cents.

Drift gill nets accounted for 69 percent of the weight of the shad taken, while stake gill nets accounted for 29 percent. Small quantities, amounting to 2 percent, were taken by haul seines and fyke nets.

*Shad fishery of the Hudson River, 1934*

| Item | New York | | | New Jersey | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Number* | *Pounds* | *Value* | *Number* | *Pounds* | *Value* | *Number* | *Pounds* | *Value* |
| Fishermen: | | | | | | | | | |
| On boats and shore: | | | | | | | | | |
| Regular | 103 | | | 6 | | | 109 | | |
| Casual | 177 | | | 36 | | | 213 | | |
| Total | 280 | | | 42 | | | 322 | | |
| Boats: | | | | | | | | | |
| Motor | | | | 5 | | | 5 | | |
| Other | 140 | | | 9 | | | 149 | | |
| Apparatus: | | | | | | | | | |
| Haul seines | 10 | | | | | | 10 | | |
| Length, yards | 1,869 | | | | | | 1,869 | | |
| Gill nets: | | | | | | | | | |
| Drift | 126 | | | | | | 126 | | |
| Square yards | 505,050 | | | | | | 505,050 | | |
| Stake | 14 | | | 14 | | | 28 | | |
| Square yards | 2,410 | | | 24,920 | | | 27,330 | | |
| Fyke nets | 11 | | | | | | 11 | | |
| Shad caught: | | | | | | | | | |
| With haul seines | 1,020 | 3,000 | $261 | | | | 1,020 | 3,000 | $261 |
| With drift gill nets | 102,281 | 302,900 | 23,770 | | | | 102,281 | 302,900 | 23,770 |
| With stake gill nets | 1,142 | 3,500 | 313 | 35,360 | 123,800 | $11,310 | 36,502 | 127,300 | 11,623 |
| With fyke nets | 1,655 | 4,800 | 420 | | | | 1,655 | 4,800 | 420 |
| Total | 106,098 | 314,200 | 24,764 | 35,360 | 123,800 | 11,310 | 141,458 | 438,000 | 36,074 |

## FISHERIES OF THE CHESAPEAKE BAY STATES

(Area XXIII)[8]

The yield of the commercial fisheries of the Chesapeake Bay States (Maryland and Virginia) during 1934 amounted to 289,010,900 pounds valued at $5,943,410 to the fishermen, representing an increase of 6 percent in volume and 17 percent in value as compared with the catch in the previous year. These fisheries gave employment to 20,591 fishermen, as compared with 20,142 in 1933.

There were 544 fishery wholesale and manufacturing establishments in the two States in 1934, as compared with 502 in 1933. In 1934 these establishments employed 12,517 persons, paid $2,758,749 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $7,826,195. In 1933 the wholesale and manufacturing firms employed 11,596 persons, paid $2,366,762 in salaries and wages, and produced manufactured products valued at $7,245,169.

[8] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area, craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery, which extends into area XXIV. Data on the operating units and catch of the fisheries of the Chesapeake Bay States have been taken largely from statistics collected by the State fishery agencies of Maryland and Virginia. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

*Fisheries of the Chesapeake Bay States, 1934*

SUMMARY OF CATCH

| Product | Maryland | | Virginia | | Total | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Fish | 12,325,000 | $368,321 | 198,292,500 | $1,847,103 | 210,617,500 | $2,215,424 |
| Shellfish, etc | 29,885,000 | 1,398,166 | 48,508,400 | 2,329,820 | 78,393,400 | 3,727,986 |
| Total | 42,210,000 | 1,766,487 | 246,800,900 | 4,176,923 | 289,010,900 | 5,943,410 |

OPERATING UNITS: BY STATES

| Item | Maryland | Virginia | Total |
|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* |
| On vessels | 645 | 1,487 | 2,132 |
| On boats and shore: | | | |
| Regular | 4,721 | 6,010 | 10,731 |
| Casual | 2,310 | 5,418 | 7,728 |
| Total | 7,676 | 12,915 | 20,591 |
| Vessels: | | | |
| Steam | | 26 | 26 |
| Net tonnage | | 2,937 | 2,937 |
| Motor | | 115 | 115 |
| Net tonnage | | 1,688 | 1,688 |
| Sail | 136 | | 136 |
| Net tonnage | 1,513 | | 1,513 |
| Total vessels | 136 | 141 | 277 |
| Total net tonnage | 1,513 | 4,625 | 6,138 |
| Boats: | | | |
| Motor | 2,900 | 3,965 | 6,865 |
| Other | 2,249 | 3,603 | 5,852 |
| Accessory boats | | 96 | 96 |
| Apparatus: | | | |
| Purse seines, menhaden | | 32 | 32 |
| Length, yards | | 9,770 | 9,770 |
| Haul seines | 305 | 183 | 488 |
| Length, yards | 31,735 | 51,426 | 83,161 |
| Gill nets: | | | |
| Anchor | 64 | | 64 |
| Square yards | 16,724 | | 16,724 |
| Drift | 272 | 312 | 584 |
| Square yards | 337,112 | 214,266 | 551,378 |
| Stake | 3,399 | 6,802 | 10,201 |
| Square yards | 292,614 | 390,811 | 683,425 |
| Lines: | | | |
| Hand | 10 | | 10 |
| Hooks | 20 | | 20 |
| Trot with baits or snoods | 1,531 | 1,437 | 2,968 |
| Baits or snoods | 945,000 | 1,075,280 | 2,020,280 |
| Trot with hooks | | 1 | 1 |
| Hooks | | 100 | 100 |
| Pound nets | 531 | 1,810 | 2,341 |
| Stop nets | | 2 | 2 |
| Square yards | | 5,310 | 5,310 |
| Fyke nets | 1,900 | 740 | 2,640 |
| Dip nets | 1,321 | 2,391 | 3,712 |
| Otter trawls | | 25 | 25 |
| Yards at mouth | | 742 | 742 |
| Pots, eel | 13,248 | 335 | 13,583 |
| Spears | 2 | | 2 |
| Scrapes | 582 | 4 | 586 |
| Yards at mouth | 582 | 4 | 586 |
| Dredges: | | | |
| Crab | | 200 | 200 |
| Yards at mouth | | 347 | 347 |
| Oyster | 374 | 316 | 690 |
| Yards at mouth | 422 | 356 | 778 |
| Tongs: | | | |
| Oyster | 4,380 | 4,342 | 8,722 |
| Other | 40 | 1,017 | 1,057 |
| Rakes: | | | |
| Oyster | | 34 | 34 |
| Other | 10 | 121 | 131 |
| Picks | | 350 | 350 |

*Fisheries of the Chesapeake Bay States, 1934*—Continued

CATCH: BY STATES

| Species | Maryland | | Virginia | | Total | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 5,233,400 | $56,581 | 5,846,200 | $38,973 | 11,079,600 | $95,554 |
| Black bass | 32,600 | 2,615 | | | 32,600 | 2,615 |
| Bluefish | 328,900 | 13,069 | 936,500 | 41,975 | 1,265,400 | 55,044 |
| Bonito | 400 | 16 | 19,600 | 731 | 20,000 | 747 |
| Butterfish | 452,000 | 18,337 | 3,339,300 | 102,443 | 3,791,300 | 120,780 |
| Cabio or crab eater | | | 25,300 | 1,063 | 25,300 | 1,063 |
| Carp | 208,700 | 13,450 | 251,600 | 10,695 | 460,300 | 24,145 |
| Catfish and bullheads | 266,600 | 10,667 | 509,800 | 20,939 | 776,400 | 31,606 |
| Cod | | | 1,500 | 25 | 1,500 | 25 |
| Crappie | 800 | 23 | | | 800 | 23 |
| Croaker | 2,131,100 | 32,240 | 19,942,800 | 233,670 | 22,073,900 | 265,910 |
| Cutlassfish | | | 1,900 | 5 | 1,900 | 5 |
| Dolphin | 100 | 10 | | | 100 | 10 |
| Drum: | | | | | | |
| Black | | | 37,500 | 750 | 37,500 | 750 |
| Red or redfish | 7,000 | 92 | 52,800 | 966 | 59,800 | 1,058 |
| Eels: | | | | | | |
| Common | 158,400 | 11,669 | 115,600 | 12,054 | 274,000 | 23,723 |
| Conger | 400 | 6 | 2,100 | 39 | 2,500 | 45 |
| Flounders | 29,100 | 1,709 | 970,600 | 47,044 | 999,700 | 48,753 |
| Gizzard shad | 18,700 | 281 | 95,400 | 1,184 | 114,100 | 1,465 |
| Haddock | | | 500 | 4 | 500 | 4 |
| Hake | | | 21,400 | 284 | 21,400 | 284 |
| Harvestfish | 26,100 | 708 | 262,800 | 11,099 | 288,900 | 11,807 |
| Herring, sea | | | 361,400 | 2,638 | 361,400 | 2,638 |
| Hickory shad | 13,400 | 284 | 94,600 | 1,923 | 108,000 | 2,207 |
| King whiting or "kingfish" | 4,700 | 235 | 101,600 | 4,658 | 106,300 | 4,893 |
| Mackerel | | | 15,000 | 1,174 | 15,000 | 1,174 |
| Menhaden | | | 143,878,800 | 600,413 | 143,878,800 | 600,413 |
| Minnows | | | 56,600 | 3,081 | 56,600 | 3,081 |
| Mullet | 29,000 | 1,540 | 85,000 | 2,823 | 114,000 | 4,363 |
| Pigfish | | | 8,900 | 159 | 8,900 | 159 |
| Pike or pickerel | 18,600 | 2,967 | 4,200 | 407 | 22,800 | 3,374 |
| Scup | 39,000 | 705 | 692,400 | 19,031 | 731,400 | 19,736 |
| Sea bass | 10,000 | 350 | 127,000 | 4,919 | 137,000 | 5,269 |
| Sea robin | | | 600 | 18 | 600 | 18 |
| Shad | 885,300 | 89,582 | 4,104,400 | 314,960 | 4,989,700 | 404,542 |
| Sharks | | | 20,200 | 483 | 20,200 | 483 |
| Silver perch | 6,000 | 145 | | | 6,000 | 145 |
| Skates | | | 10,100 | 80 | 10,100 | 80 |
| Spanish mackerel | 700 | 70 | 52,200 | 4,131 | 52,900 | 4,201 |
| Spot | 62,300 | 1,912 | 2,041,200 | 58,707 | 2,103,500 | 60,619 |
| Squeteagues or "sea trout": | | | | | | |
| Gray | 1,477,700 | 42,614 | 13,405,800 | 253,360 | 14,883,500 | 295,974 |
| Spotted | 7,900 | 791 | 49,100 | 2,531 | 57,000 | 3,322 |
| Striped bass | 332,700 | 37,122 | 309,800 | 29,061 | 642,500 | 66,183 |
| Sturgeon | 200 | 10 | 8,300 | 1,079 | 8,500 | 1,089 |
| Suckers | 8,300 | 342 | 13,300 | 331 | 21,600 | 673 |
| Sunfish | 600 | 22 | 24,000 | 600 | 24,600 | 622 |
| Swellfish | | | 1,700 | 59 | 1,700 | 59 |
| Tautog | 100 | 5 | 500 | 7 | 600 | 12 |
| Thimble-eyed mackerel | | | 22,000 | 345 | 22,000 | 345 |
| White perch | 419,000 | 21,303 | 315,400 | 12,670 | 734,400 | 33,973 |
| Whiting | | | 4,500 | 68 | 4,500 | 68 |
| Yellow perch | 115,200 | 6,849 | 50,700 | 3,444 | 165,900 | 10,293 |
| Total | 12,325,000 | 368,321 | 198,292,500 | 1,847,103 | 210,617,500 | 2,215,424 |
| SHELLFISH, ETC. | | | | | | |
| Crabs: | | | | | | |
| Hard | 13,620,900 | 274,734 | 22,516,000 | 464,044 | 36,136,900 | 738,778 |
| Soft | 2,288,800 | 215,204 | 1,370,300 | 95,982 | 3,659,100 | 311,186 |
| Lobsters | | | 100 | 12 | 100 | 12 |
| Clams, hard, public | 32,000 | 3,000 | 2,609,100 | 364,370 | 2,641,100 | 367,370 |
| Mussels, sea | | | 23,400 | 540 | 23,400 | 540 |
| Oysters: [1] | | | | | | |
| Market, public, spring | 3,902,300 | 229,243 | 4,783,300 | 291,642 | 8,685,600 | 520,885 |
| Market, public, fall | 8,685,100 | 513,154 | 5,217,500 | 312,563 | 13,902,600 | 825,717 |
| Market, private, spring | 567,300 | 73,065 | 5,490,800 | 369,965 | 6,058,100 | 443,030 |
| Market, private, fall | 762,600 | 87,421 | 6,377,200 | 425,648 | 7,139,800 | 513,069 |
| Scallops, sea | | | 1,300 | 896 | 1,300 | 896 |
| Squid | 21,000 | 835 | 92,800 | 3,179 | 113,800 | 4,014 |
| Terrapin, diamond back | 3,000 | 1,400 | 23,200 | 870 | 26,200 | 2,270 |
| Turtles, snapper | 2,000 | 110 | 3,400 | 109 | 5,400 | 219 |
| Total | 29,885,000 | 1,398,166 | 48,508,400 | 2,329,820 | 78,393,400 | 3,727,986 |
| Grand total | 42,210,000 | 1,766,487 | 246,800,900 | 4,176,923 | 289,010,900 | 5,943,410 |

[1] Statistics on oysters used in this table are based on yields of 6.24 pounds of meats to the bushel for market oysters in Maryland and 6.32 pounds in Virginia.

*Fisheries of the Chesapeake Bay States, 1934*—Continued

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

| Product | Maryland | | Virginia | | Total | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Crabs: | | | | | | |
| Hard ..... number | 40,862,700 | $274,734 | 67,548,000 | $464,044 | 108,410,700 | $738,778 |
| Soft ..... do | 9,155,200 | 215,204 | 5,481,200 | 95,982 | 14,636,400 | 311,186 |
| Clams, hard ..... bushels | 4,000 | 3,000 | 326,138 | 364,370 | 330,138 | 367,370 |
| Mussels ..... do | | | 1,800 | 540 | 1,800 | 540 |
| Oysters: | | | | | | |
| Market, public, spring ..... do | 625,369 | 229,243 | 756,851 | 291,642 | 1,382,220 | 520,885 |
| Market, public, fall ..... do | 1,391,843 | 513,154 | 825,554 | 312,563 | 2,217,397 | 825,717 |
| Market, private, spring ..... do | 90,913 | 73,065 | 868,797 | 369,965 | 959,710 | 443,030 |
| Market, private, fall ..... do | 122,212 | 87,421 | 1,009,051 | 425,648 | 1,131,263 | 513,069 |
| Scallops, sea ..... do | | | 217 | 896 | 217 | 896 |

SEED OYSTER FISHERY

| Item | Maryland | | Virginia | | Total | |
|---|---|---|---|---|---|---|
| OPERATING UNITS | | | | | | |
| Fishermen: | *Number* | | *Number* | | *Number* | |
| On vessels | 4 | | 24 | | 28 | |
| On boats and shore: | | | | | | |
| Regular | | | 1,005 | | 1,005 | |
| Casual | | | 120 | | 120 | |
| Total | 4 | | 1,149 | | 1,153 | |
| Vessels: | | | | | | |
| Motor | | | 7 | | 7 | |
| Net tonnage | | | 69 | | 69 | |
| Sail | 1 | | | | 1 | |
| Net tonnage | 23 | | | | 23 | |
| Total vessels | 1 | | 7 | | 8 | |
| Total net tonnage | 23 | | 69 | | 92 | |
| Boats: | | | | | | |
| Motor | | | 558 | | 558 | |
| Other | | | 36 | | 36 | |
| Apparatus: | | | | | | |
| Dredges | 2 | | 8 | | 10 | |
| Yards at mouth | 3 | | 16 | | 19 | |
| Tongs | | | 1,131 | | 1,131 | |
| CATCH | | | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public, spring | 3,000 | $360 | 1,153,083 | $173,664 | 1,156,083 | $174,024 |
| Seed, public, fall | 3,000 | 360 | 864,342 | 130,348 | 867,342 | 130,708 |
| Seed, private, spring | | | 32,868 | 1,643 | 32,868 | 1,643 |
| Seed, private, fall | | | 32,868 | 1,644 | 32,868 | 1,644 |
| Total | 6,000 | 720 | 2,083,161 | 307,299 | 2,089,161 | 308,019 |

NOTE.—Of the number of persons fishing for seed oysters, 1,005 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 6 vessels, 461 motorboats, 36 other boats, 8 dredges, and 987 tongs.

*Industries related to the fisheries of the Chesapeake Bay States, 1934*

OPERATING UNITS, SALARIES, AND WAGES

| Item | Maryland | Virginia | Total |
|---|---|---|---|
| Transporting: | | | |
| Persons engaged: | *Number* | *Number* | *Number* |
| On vessels | 334 | 637 | 971 |
| On boats | | 137 | 137 |
| Total | 334 | 774 | 1,108 |
| Vessels: | | | |
| Steam | | 1 | 1 |
| Net tonnage | | 103 | 103 |
| Motor | 156 | 277 | 433 |
| Net tonnage | 2,186 | 3,150 | 5,336 |
| Sail | 15 | | 15 |
| Net tonnage | 387 | | 387 |
| Total vessels | 171 | 278 | 449 |
| Total net tonnage | 2,573 | 3,253 | 5,826 |
| Boats | | 111 | 111 |
| Wholesale and manufacturing: | | | |
| Establishments | 319 | 225 | 544 |
| Persons engaged: | | | |
| Proprietors | 424 | 265 | 689 |
| Salaried employees | 198 | 165 | 363 |
| Wage earners: | | | |
| Average for season | 5,977 | 5,488 | 11,465 |
| Average for year | 2,591 | 2,463 | 5,054 |
| Paid to salaried employees | $308,800 | $209,440 | $518,240 |
| Paid to wage earners | $1,223,183 | $1,017,326 | $2,240,509 |
| Total salaries and wages | $1,531,983 | $1,226,766 | $2,758,749 |
| Fishermen manufacturing | 79 | 55 | 134 |

PRODUCTS MANUFACTURED

| Item | Maryland | | Virginia | |
|---|---|---|---|---|
| By manufacturing establishments: | | | | |
| Alewives: | | | | |
| Salted: | *Quantity* | *Value* | *Quantity* | *Value* |
| Corned ... pounds | (1) | (1) | 456,320 | $11,500 |
| Pickled [2] ... do | 1,034,710 | $38,875 | (3) | (3) |
| Tight-pack cut ... do | | | 341,600 | 9,070 |
| Canned ... standard cases | 17,951 | 52,585 | 548 | 1,459 |
| Roe, canned ... do | 5,525 | 29,917 | 7,942 | 36,805 |
| Dry scrap ... tons | (3) | (3) | 370 | 12,008 |
| Oil ... gallons | (1) | (1) | 12,750 | 1,430 |
| Croaker: | | | | |
| Fresh fillets ... pounds | | | 37,500 | 3,630 |
| Fresh, pandressed ... do | | | 560,000 | 30,150 |
| Flounders, fresh fillets ... do | | | 32,000 | 5,800 |
| Haddock, fresh fillets ... do | | | 9,500 | 1,350 |
| Menhaden products: | | | | |
| Dry scrap and meal ... tons | | | 17,645 | 565,354 |
| Oil ... gallons | | | 1,253,924 | 248,401 |
| Sea bass, fresh fillets ... pounds | | | 41,500 | 6,225 |
| Squeteagues: | | | | |
| Fresh fillets ... do | | | 105,000 | 8,880 |
| Fresh, pandressed ... do | | | 965,000 | 54,350 |
| Crabs, blue: | | | | |
| Meat, packaged, fresh cooked ... do | 2,124,687 | 704,576 | 1,656,798 | 634,812 |
| Dry scrap ... tons | (3) | (3) | 1,183 | 18,285 |
| Clams, hard, fresh shucked ... gallons | | | 3,778 | 6,254 |
| Oysters, fresh shucked ... do | 1,988,799 | 2,017,691 | 1,990,505 | 2,193,455 |
| Oyster-shell products: | | | | |
| Poulty feed ... tons | 35,602 | 178,443 | 10,689 | 57,235 |
| Lime ... do | 21,346 | 35,483 | 9,376 | 26,786 |
| Lime, "burned" ... do | | | 9,277 | 51,510 |
| Unclassified products: | | | | |
| Canned ... standard cases | [4] 42,294 | [4] 183,976 | (1) | (1) |
| Scrap and meal ... tons | [5] 680 | [5] 12,690 | [6] 2,459 | [6] 45,481 |
| Miscellaneous | | [7] 500,514 | | [8] 41,215 |
| Total | | 3,754,750 | | 4,071,445 |

See footnotes at end of table.

*Industries related to the fisheries of the Chesapeake Bay States, 1934*—Continued

PRODUCTS MANUFACTURED—Continued

| Item | | Maryland | | Virginia | |
|---|---|---|---|---|---|
| By fishermen: | | | | | |
| Alewives: | | *Quantity* | *Value* | *Quantity* | *Value* |
| Corned | pounds | | | 16,000 | $320 |
| Pickled | do | 8,300 | $326 | 1,000 | 30 |
| Eels: | | | | | |
| Smoked | do | 400 | 100 | | |
| Salted | do | 102,152 | 6,922 | | |
| Sturgeon roe, salted | do | 30 | 15 | 287 | 258 |
| Oysters, fresh shucked | gallons | | | 3,746 | 3,057 |
| Scallops, sea, fresh shucked | do | | | 148 | 200 |
| Total | | | 7,363 | | 3,865 |
| Grand total | | | 3,762,113 | | 4,075,310 |

[1] The production of this item is included under "Miscellaneous."
[2] This item is usually an intermediate product, and, although included in the total, may be shown in its final stage of processing in this or another State.
[3] The production of this item is included under "Unclassified products."
[4] Includes canned hard-clam chowder, oysters, and terrapins.
[5] Includes alewife dry scrap and blue-crab meal.
[6] Includes menhaden acid scrap, and miscellaneous dry and acidulated scrap.
[7] Includes corned alewives; smoked alewives, butterfish, carp, chub, cisco, eels, herring, salmon, sturgeon, tullibees, and whitefish; herring, bloaters; kippered salmon; alewife oil; marine-shell products; and pearl essence.
[8] Includes salted tight-pack alewife roe; pickled alewives; pan-dressed frozen croaker and squeteagues; menhaden oil; and canned blue crabs.

NOTE.—The total value of manufactured products in the Chesapeake Bay States was as follows: By manufacturing establishments, $7,826,195; and by fishermen, $11,228. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting vessels and boats, 483 have been included as fishermen, and among the total number of persons engaged in the preparation of fishermen's prepared products, all have been included as fishermen.

## MARYLAND

*Fisheries of Maryland, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Gill nets | | | Lines | | Pound nets | Fyke nets | Dip nets |
|---|---|---|---|---|---|---|---|---|---|
| | | Anchor | Drift | Stake | Hand | Trot with baits or snoods | | | |
| Fishermen: | | | | | | | | | |
| On boats and shore: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 362 | 6 | 38 | 103 | 10 | 1,088 | 369 | 55 | 740 |
| Casual | 298 | 3 | 331 | 109 | | 180 | 126 | 69 | 581 |
| Total | 660 | 9 | 369 | 212 | 10 | 1,268 | 495 | 124 | 1,321 |
| Boats: | | | | | | | | | |
| Motor | 138 | 7 | 84 | 92 | 5 | 1,120 | 175 | 48 | 15 |
| Other | 204 | 3 | 129 | 70 | | 139 | 165 | 78 | 1,230 |
| Apparatus: | | | | | | | | | |
| Number | 305 | 64 | 272 | 3,399 | 10 | 1,531 | 531 | 1,900 | 1,321 |
| Length, yards | 31,735 | | | | | | | | |
| Square yards | | 16,724 | 337,112 | 292,614 | | | | | |
| Hooks, baits, or snoods | | | | | 20 | 945,000 | | | |

*Fisheries of Maryland, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Pots, eel | Spears | Scrapes | Dredges, oyster | Tongs | | Rakes, other than for oysters | By hand, other than for oysters | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Oyster | Other | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | |
| On vessels | | | | 645 | | | | | 645 |
| On boats and shore: | | | | | | | | | |
| Regular | 125 | 2 | 321 | 88 | 3,550 | 40 | 10 | 24 | 4,721 |
| Casual | 29 | | | | 828 | | | | 2,310 |
| Total | 154 | 2 | 321 | 733 | 4,378 | 40 | 10 | 24 | 7,676 |
| Vessels, sail | | | | 136 | | | | | 136 |
| Net tonnage | | | | 2,513 | | | | | 1,513 |
| Boats: | | | | | | | | | |
| Motor | 122 | | | 19 | 2,035 | 13 | | | 2,900 |
| Other | 33 | 1 | 286 | 32 | 149 | 35 | 10 | 10 | 2,249 |
| Apparatus: | | | | | | | | | |
| Number | 13,248 | 2 | 582 | 374 | 4,380 | 40 | 10 | | |
| Yards at mouth | | | 582 | 422 | | | | | |

CATCH: By gear

| Species | Haul seines | | Gill nets | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Anchor | | Drift | | Stake | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 61,900 | $733 | | | 8,800 | $191 | 32,100 | $776 |
| Black bass | 17,700 | 1,370 | | | | | 600 | 48 |
| Bluefish | 91,900 | 2,495 | | | 45,000 | 2,650 | 8,600 | 437 |
| Butterfish | 2,100 | 78 | | | | | | |
| Carp | 178,900 | 11,914 | | | 300 | 10 | 1,000 | 44 |
| Catfish and bullheads | 60,600 | 2,498 | | | | | 600 | 31 |
| Crappie | 100 | 4 | | | | | 200 | 8 |
| Croaker | 273,400 | 3,609 | | | 2,100 | 47 | 12,800 | 281 |
| Drum, red or redfish | 2,700 | 27 | | | | | | |
| Eels, common | 2,200 | 153 | | | | | | |
| Flounders | 900 | 42 | | | | | | |
| Gizzard shad | 4,200 | 43 | | | | | | |
| Mullet | | | | | 29,000 | 1,540 | | |
| Pike or pickerel | 6,200 | 1,093 | | | | | 1,200 | 242 |
| Shad | 1,100 | 83 | 16,400 | $1,730 | 227,100 | 20,944 | 94,900 | 9,950 |
| Silver perch | 5,800 | 139 | | | | | | |
| Spot | 12,700 | 424 | | | 2,300 | 67 | 700 | 29 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 202,700 | 7,955 | | | 6,800 | 316 | 3,500 | 219 |
| Spotted | 7,500 | 750 | | | | | | |
| Striped bass | 77,000 | 8,322 | 6,500 | 797 | 42,500 | 4,788 | 53,300 | 6,318 |
| Suckers | 3,200 | 126 | | | | | 400 | 13 |
| Sunfish | 300 | 12 | | | | | 300 | 10 |
| White perch | 57,100 | 3,052 | | | 8,400 | 660 | 38,300 | 2,369 |
| Yellow perch | 20,100 | 1,133 | | | | | 500 | 43 |
| Crabs, soft | 205,500 | 26,527 | | | | | | |
| Total | 1,295,800 | 72,582 | 22,900 | 2,527 | 372,300 | 31,213 | 249,000 | 20,818 |

*Fisheries of Maryland, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Lines | | | | Pound nets | | Fyke nets | |
|---|---|---|---|---|---|---|---|---|
| | Hand | | Trot with baits or snoods | | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | | | 5,127,500 | $54,817 | 3,100 | $64 |
| Black bass | | | | | 100 | 7 | 14,200 | 1,190 |
| Bluefish | 50,000 | $2,500 | | | 132,400 | 4,957 | 1,000 | 30 |
| Bonito | 400 | 16 | | | | | | |
| Butterfish | | | | | 449,900 | 18,259 | | |
| Carp | | | | | 16,200 | 731 | 12,300 | 751 |
| Catfish and bullheads | | | | | 78,800 | 2,974 | 126,600 | 5,164 |
| Crappie | | | | | | | 500 | 11 |
| Croaker | | | | | 1,835,800 | 28,163 | 7,000 | 140 |
| Dolphin | 100 | 10 | | | | | | |
| Drum, red or redfish | | | | | 4,300 | 65 | | |
| Eels: | | | | | | | | |
| Common | | | | | 9,700 | 699 | 8,100 | 618 |
| Couger | 400 | 6 | | | | | | |
| Flounders | 1,000 | 80 | | | 27,000 | 1,573 | 200 | 14 |
| Gizzard shad | | | | | 14,500 | 238 | | |
| Harvestfish | | | | | 26,100 | 708 | | |
| Hickory shad | | | | | 13,400 | 284 | | |
| King whiting or "kingfish" | | | | | 4,700 | 235 | | |
| Pike or pickerel | | | | | 2,400 | 350 | 8,800 | 1,282 |
| Scup | 2,500 | 50 | | | 36,500 | 655 | | |
| Sea bass | 10,000 | 350 | | | | | | |
| Shad | | | | | 543,800 | 56,703 | | |
| Silver perch | | | | | | | 200 | 6 |
| Spanish mackerel | | | | | 700 | 70 | | |
| Spot | | | | | 46,100 | 1,377 | 500 | 15 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 2,500 | 250 | | | 1,259,600 | 33,744 | 2,600 | 130 |
| Spotted | | | | | 400 | 41 | | |
| Striped bass | | | | | 148,900 | 16,343 | 4,500 | 554 |
| Sturgeon | | | | | 200 | 10 | | |
| Suckers | | | | | 1,000 | 51 | 3,700 | 152 |
| Tautog | 100 | 5 | | | | | | |
| White perch | | | | | 180,700 | 8,734 | 134,500 | 6,488 |
| Yellow perch | | | | | 10,100 | 568 | 84,500 | 5,105 |
| Crabs, hard | | | 13,010,800 | $262,532 | | | | |
| Squid | | | | | 21,000 | 835 | | |
| Turtles, snapper | | | | | | | 2,000 | 110 |
| Total | 67,000 | 3,267 | 13,010,800 | 262,532 | 9,991,800 | 233,191 | 414,300 | 21,824 |

| Species | Dip nets | | Pots, eel | | Spears | | Scrapes | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Eels, common | | | 136,600 | $10,019 | 1,800 | $180 | | |
| Shad | 2,000 | $172 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | 3,500 | 70 | | | | | 606,600 | $12,132 |
| Soft | 1,364,300 | 129,566 | | | | | 719,000 | 59,111 |
| Total | 1,369,800 | 129,808 | 136,600 | 10,019 | 1,800 | 180 | 1,325,600 | 71,243 |

| Species | Dredges | | Tongs | | Rakes | | By hand | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Clams, hard, public | | | 28,800 | $2,700 | 2,600 | $240 | 600 | $60 |
| Oysters: | | | | | | | | |
| Market, public, spring | 613,700 | $34,936 | 3,288,600 | 194,307 | | | | |
| Market, public, fall | 2,467,700 | 138,683 | 6,217,400 | 374,471 | | | | |
| Market, private, spring | 38,600 | 6,775 | 528,700 | 66,290 | | | | |
| Market, private, fall | 47,500 | 9,120 | 715,100 | 78,301 | | | | |
| Terrapin, diamond back | | | | | | | 3,000 | 1,400 |
| Total | 3,167,500 | 189,514 | 10,778,600 | 716,069 | 2,600 | 240 | 3,600 | 1,460 |

*Fisheries of Maryland, 1934*—Continued

OPERATING UNITS: BY COUNTIES

| Item | Anne Arundel | Baltimore | Calvert | Caroline | Cecil | Charles | Dorchester | Harford |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | 13 | 8 | | | | 200 | |
| On boats and shore: | | | | | | | | |
| Regular | 498 | 8 | 203 | 10 | 34 | 115 | 769 | 5 |
| Casual | 365 | 66 | 83 | 29 | 79 | 222 | 159 | 55 |
| Total | 863 | 87 | 294 | 39 | 113 | 337 | 1,128 | 60 |
| Vessels, sail | | 3 | 2 | | | | 40 | |
| Net tonnage | | 64 | 32 | | | | 356 | |
| Boats: | | | | | | | | |
| Motor | 345 | 23 | 103 | 5 | 40 | 140 | 499 | 24 |
| Other | 240 | 43 | 128 | 17 | 40 | 80 | 145 | 16 |
| Apparatus: | | | | | | | | |
| Haul seines | 50 | 11 | 1 | 4 | 24 | 19 | 5 | 10 |
| Length, yards | 1,630 | 3,450 | 135 | 1,150 | 5,920 | 3,270 | 1,750 | 3,150 |
| Gill nets: | | | | | | | | |
| Anchor | | | | | 64 | | | |
| Square yards | | | | | 16,724 | | | |
| Drift | 2 | | 1 | 20 | 25 | 35 | 24 | 24 |
| Square yards | 1,500 | | 600 | 2,620 | 32,750 | 120,323 | 25,293 | 35,494 |
| Stake | 8 | 26 | 5 | 60 | 62 | 1,014 | 175 | 276 |
| Square yards | 1,064 | 1,212 | 400 | 1,666 | 2,482 | 74,971 | 6,300 | 47,070 |
| Lines: | | | | | | | | |
| Trot with baits or snoods | 85 | 36 | 41 | | | 24 | 543 | |
| Baits or snoods | 45,000 | 17,800 | 18,500 | | | 22,000 | 245,000 | |
| Pound nets | 23 | 15 | 13 | 10 | 25 | 32 | 114 | 4 |
| Fyke nets | 4 | 240 | | 16 | 701 | 52 | 9 | 280 |
| Dip nets | 182 | | 111 | | | 29 | 99 | |
| Pots, eel | 250 | 411 | | 75 | 500 | 46 | 3,548 | 87 |
| Dredges, oyster | | 6 | 4 | | | | 90 | |
| Yards at mouth | | 9 | 5 | | | | 102 | |
| Tong, oyster | 755 | | 240 | | | 188 | 624 | |

| Item | Kent | Prince Georges | Queen Annes | St. Marys | Somerset | Talbot | Wicomico | Worcester |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | 4 | 364 | 56 | | |
| On boats and shore: | | | | | | | | |
| Regular | 378 | | 542 | 457 | 750 | 544 | 292 | 116 |
| Casual | 234 | 23 | 111 | 267 | 153 | 192 | 147 | 125 |
| Total | 612 | 23 | 653 | 728 | 1,267 | 792 | 439 | 241 |
| Vessels, sail | | | | 1 | 78 | 12 | | |
| Net tonnage | | | | 10 | 960 | 91 | | |
| Boats: | | | | | | | | |
| Motor | 211 | 3 | 233 | 272 | 350 | 399 | 163 | 90 |
| Other | 156 | 12 | 112 | 265 | 556 | 220 | 69 | 150 |
| Apparatus: | | | | | | | | |
| Haul seines | 73 | 8 | 73 | 6 | 12 | 1 | 1 | 7 |
| Length, yards | 4,142 | 845 | 2,365 | 1,205 | 1,008 | 250 | 500 | 965 |
| Gill nets: | | | | | | | | |
| Drift | 21 | 8 | | | 11 | 3 | 77 | 21 |
| Square yards | 42,105 | 12,385 | | | 2,680 | 4,394 | 53,050 | 3,918 |
| Stake | 1,048 | 3 | 35 | | 211 | 60 | 416 | |
| Square yards | 125,460 | 600 | 4,104 | | 3,940 | 6,705 | 16,640 | |
| Lines: | | | | | | | | |
| Hand | | | | | | | | 10 |
| Hooks | | | | | | | | 20 |
| Trot with baits or snoods | 113 | | 92 | 136 | 74 | 259 | 7 | 121 |
| Baits or snoods | 65,500 | | 69,000 | 130,800 | 53,200 | 192,000 | 5,600 | 80,600 |
| Pound nets | 24 | 2 | 8 | 73 | 48 | 102 | 19 | 19 |
| Fyke nets | 408 | 60 | 50 | | 42 | 18 | 20 | |
| Dip nets | 50 | | 100 | 200 | 359 | 160 | | 31 |
| Pots, eel | 784 | 41 | 1,290 | 18 | | 6,092 | 6 | 100 |
| Spears | | | | | | | | 2 |
| Scrapes | | | | | 582 | | | |
| Yards at mouth | | | | | 582 | | | |
| Dredges, oyster | | | | 2 | 220 | 24 | | 28 |
| Yards at mouth | | | | 2 | 256 | 28 | | 20 |
| Tongs: | | | | | | | | |
| Oyster | 377 | | 562 | 471 | 339 | 396 | 316 | 112 |
| Other | | | | | | | | 40 |
| Rakes, other than for oysters | | | | | | | | 10 |

*Fisheries of Maryland, 1934*—Continued

CATCH: BY COUNTIES

| Species | Anne Arundel | | Baltimore | | Calvert | | Caroline | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 371,500 | $4,100 | 37,300 | $646 | 157,000 | $1,670 | 8,800 | $146 |
| Black bass | | | 200 | 30 | | | | |
| Bluefish | 126,600 | 2,500 | 9,400 | 386 | 2,100 | 210 | 1,800 | 90 |
| Butterfish | 2,400 | 96 | | | | | | |
| Carp | 2,400 | 161 | 13,900 | 878 | 600 | 42 | 10,400 | 822 |
| Catfish and bullheads | 700 | 31 | 17,800 | 759 | 9,600 | 322 | 5,600 | 223 |
| Croaker | 125,400 | 2,022 | 3,300 | 129 | 23,000 | 440 | 500 | 10 |
| Eels, common | 16,600 | 1,020 | 7,900 | 483 | 100 | 11 | 2,200 | 111 |
| Flounders | 500 | 27 | 200 | 10 | 400 | 30 | | |
| Gizzard shad | 2,500 | 25 | 4,100 | 60 | 400 | 8 | 5,000 | 100 |
| Harvestfish | 500 | 12 | | | | | | |
| Hickory shad | 300 | 11 | 700 | 14 | | | | |
| Pike or pickerel | | | 600 | 100 | 300 | 39 | | |
| Shad | 27,400 | 2,738 | 1,000 | 120 | 25,400 | 3,801 | 2,300 | 240 |
| Spot | 9,400 | 248 | 4,500 | 96 | 600 | 38 | | |
| Squeteagues or "sea trout", gray | 258,500 | 12,686 | 4,700 | 362 | 8,800 | 536 | 5,500 | 325 |
| Striped bass | 4,400 | 520 | 12,600 | 1,554 | 1,200 | 127 | 15,000 | 1,814 |
| Suckers | | | | | 900 | 62 | 100 | 9 |
| White perch | 2,000 | 92 | 77,400 | 3,774 | 4,800 | 321 | 19,700 | 1,256 |
| Yellow perch | 200 | 13 | 11,700 | 709 | 2,800 | 168 | 800 | 48 |
| Crabs: | | | | | | | | |
| Hard | 439,000 | 8,780 | 156,500 | 6,156 | 160,000 | 3,600 | | |
| Soft | 67,100 | 7,479 | | | 80,800 | 8,623 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 546,900 | 36,445 | 14,400 | 789 | 73,900 | 4,926 | | |
| Market, public, fall | 1,039,000 | 69,741 | 109,200 | 5,880 | 238,900 | 15,777 | | |
| Market, private, spring | | | | | 63,000 | 5,375 | | |
| Market, private, fall | | | | | 54,000 | 4,500 | | |
| Total | 3,043,300 | 148,747 | 487,400 | 22,935 | 908,600 | 50,626 | 77,700 | 5,194 |

| Species | Cecil | | Charles | | Dorchester | | Hartford | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 494,500 | $3,331 | 5,300 | $120 | 275,400 | $3,774 | 113,000 | $1,010 |
| Black bass | 19,500 | 1,488 | 2,100 | 210 | | | 6,600 | 480 |
| Bluefish | | | 200 | 8 | 25,300 | 1,537 | | |
| Butterfish | | | | | 3,400 | 158 | | |
| Carp | 22,900 | 1,503 | 52,300 | 2,481 | 5,500 | 240 | 46,100 | 3,897 |
| Catfish and bullheads | 66,000 | 2,554 | 25,400 | 1,021 | 9,700 | 466 | 32,700 | 1,340 |
| Crappie | 600 | 15 | | | | | 200 | 8 |
| Croaker | | | 6,100 | 126 | 171,600 | 2,568 | | |
| Drum, red or redfish | | | | | 600 | 12 | | |
| Eels, common | 8,500 | 482 | 2,700 | 266 | 58,700 | 4,696 | 3,700 | 236 |
| Flounders | | | 100 | 3 | 9,300 | 358 | | |
| Gizzard shad | 300 | 6 | 3,400 | 27 | 200 | 4 | | |
| Hickory shad | 200 | 4 | | | 200 | 4 | | |
| Pike or pickerel | 8,600 | 1,232 | 1,100 | 191 | | | 5,300 | 1,002 |
| Shad | 78,900 | 8,573 | 23,100 | 2,363 | 78,000 | 6,904 | 31,900 | 3,361 |
| Silver perch | | | 1,800 | 59 | | | | |
| Spot | | | 100 | 3 | 2,000 | 81 | | |
| Squeteagues or "sea trout", gray | | | 8,700 | 541 | 36,300 | 1,349 | | |
| Striped bass | 29,500 | 3,229 | 34,800 | 4,361 | 19,900 | 2,269 | 18,800 | 2,398 |
| Sturgeon | 200 | 10 | | | | | | |
| Suckers | 1,400 | 50 | 100 | 3 | | | 1,600 | 37 |
| Sunfish | | | | | | | 600 | 22 |
| White perch | 61,200 | 2,943 | 21,900 | 1,277 | 47,300 | 1,822 | 33,700 | 1,680 |
| Yellow perch | 47,300 | 2,368 | 3,300 | 194 | | | 22,000 | 1,293 |
| Crabs: | | | | | | | | |
| Hard | | | 227,000 | 4,300 | 3,486,800 | 69,736 | | |
| Soft | | | 3,500 | 470 | 219,900 | 17,587 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | 77,000 | 4,806 | 450,100 | 26,320 | | |
| Market, public, fall | | | 105,300 | 6,744 | 1,043,200 | 60,778 | | |
| Terrapin, diamond back | | | | | 1,000 | 500 | | |
| Turtles, snapper | 2,000 | 110 | | | | | | |
| Total | 841,600 | 27,898 | 605,300 | 29,574 | 5,944,400 | 201,163 | 316,200 | 16,764 |

*Fisheries of Maryland, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Kent | | Prince Georges | | Queen Annes | | St. Marys | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 133,300 | $1,898 | 1,000 | $20 | 23,900 | $284 | 287,400 | $2,879 |
| Black bass | 200 | 20 | 3,900 | 380 | | | | |
| Bluefish | 16,800 | 692 | | | 3,700 | 170 | 16,100 | 861 |
| Butterfish | 700 | 23 | | | | | 2,800 | 135 |
| Carp | 8,300 | 265 | 28,100 | 1,881 | 12,000 | 942 | 700 | 35 |
| Catfish and bullheads | 37,300 | 1,490 | 12,800 | 510 | 5,100 | 198 | 1,600 | 74 |
| Croaker | 373,000 | 5,999 | | | 7,100 | 203 | 85,200 | 1,509 |
| Eels, common | 7,200 | 574 | 300 | 22 | 5,000 | 541 | 1,700 | 91 |
| Flounders | 100 | 5 | | | | | 3,200 | 180 |
| Gizzard shad | 900 | 18 | | | | | 500 | 7 |
| Hickory shad | 100 | 2 | | | | | 2,300 | 52 |
| Pike or pickerel | 2,300 | 355 | 400 | 48 | | | | |
| Shad | 97,900 | 10,000 | 3,200 | 335 | 1,400 | 155 | 71,900 | 6,304 |
| Silver perch | | | 4,200 | 86 | | | | |
| Spot | 4,700 | 162 | | | 100 | 4 | 9,100 | 273 |
| Squeteagues or "sea trout", gray | 57,800 | 2,640 | 100 | 4 | | | 36,900 | 1,492 |
| Striped bass | 98,400 | 10,187 | 700 | 76 | 3,200 | 459 | 36,000 | 3,977 |
| Suckers | 500 | 28 | 2,000 | 80 | 600 | 18 | | |
| White perch | 97,000 | 4,873 | 2,300 | 185 | 6,000 | 355 | 5,000 | 330 |
| Yellow perch | 14,500 | 721 | 1,800 | 136 | 8,800 | 1,057 | 100 | 8 |
| Crabs: | | | | | | | | |
| Hard | 430,300 | 8,606 | | | 596,400 | 11,968 | 770,000 | 15,400 |
| Soft | 113,100 | 14,519 | | | 98,200 | 19,566 | 88,000 | 7,880 |
| Oysters: | | | | | | | | |
| Market, public, spring | 396,500 | 23,128 | | | 816,200 | 47,614 | 197,700 | 10,033 |
| Market, public, fall | 834,200 | 48,660 | | | 1,707,100 | 99,622 | 285,800 | 14,417 |
| Market, private, spring | | | | | | | 87,000 | 6,525 |
| Market, private, fall | | | | | | | 78,000 | 6,500 |
| Total | 2,725,100 | 134,865 | 60,800 | 3,763 | 3,294,800 | 183,156 | 2,067,000 | 78,962 |

| Species | Somerset | | Talbot | | Wicomico | | Worcester | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 345,700 | $3,807 | 2,856,900 | $31,629 | 57,400 | $659 | 65,000 | $608 |
| Black bass | | | | | 100 | 7 | | |
| Bluefish | 5,700 | 369 | 51,900 | 2,906 | 10,500 | 325 | 58,800 | 3,015 |
| Bonito | | | | | | | 400 | 16 |
| Butterfish | 6,200 | 415 | | | 1,500 | 110 | 435,000 | 17,400 |
| Carp | 500 | 21 | 1,300 | 74 | 3,700 | 208 | | |
| Catfish and bullheads | 9,800 | 416 | 7,600 | 323 | 23,400 | 865 | 1,500 | 75 |
| Croaker | 309,300 | 3,048 | 200,600 | 3,716 | 25,600 | 450 | 801,000 | 12,020 |
| Dolphin | | | | | | | 100 | 10 |
| Drum, red or redfish | 2,700 | 27 | | | | | 3,700 | 53 |
| Eels: | | | | | | | | |
| Common | 1,700 | 86 | 33,500 | 2,370 | 2,300 | 145 | 6,300 | 535 |
| Conger | | | | | | | 400 | 6 |
| Flounders | 3,800 | 228 | 2,300 | 124 | 5,200 | 414 | 4,000 | 330 |
| Gizzard shad | | | | | 1,400 | 26 | | |
| Harvestfish | 1,600 | 126 | | | 9,000 | 270 | 15,000 | 300 |
| Hickory shad | 6,100 | 91 | 3,000 | 88 | 200 | 4 | 300 | 14 |
| King whiting or "kingfish" | | | | | | | 4,700 | 235 |
| Mullet | | | | | | | 29,000 | 1,540 |
| Scup | | | | | | | 39,000 | 705 |
| Sea bass | | | | | | | 10,000 | 350 |
| Shad | 95,300 | 8,857 | 208,600 | 24,164 | 116,100 | 9,724 | 22,900 | 1,943 |
| Spanish mackerel | | | | | | | 700 | 70 |
| Spot | 6,600 | 260 | 2,200 | 74 | 1,200 | 26 | 21,800 | 647 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 139,900 | 4,961 | 30,300 | 1,468 | 34,500 | 1,005 | 855,700 | 15,245 |
| Spotted | 7,900 | 791 | | | | | | |
| Striped bass | 4,100 | 436 | 22,900 | 2,346 | 31,200 | 3,369 | | |
| Suckers | | | 200 | 10 | | | 900 | 45 |
| Tautog | | | | | | | 100 | 5 |
| White perch | 8,200 | 435 | 12,100 | 631 | 17,900 | 1,159 | 2,500 | 170 |
| Yellow perch | | | 1,200 | 88 | 700 | 46 | | |
| Crabs: | | | | | | | | |
| Hard | 2,622,900 | 52,458 | 3,536,800 | 69,842 | 40,000 | 800 | 1,155,200 | 23,088 |
| Soft | 1,458,700 | 119,388 | 115,700 | 16,192 | | | 43,800 | 3,500 |
| Clams, hard, public | | | | | | | 32,000 | 3,000 |
| Oysters: | | | | | | | | |
| Market, public, spring | 786,600 | 43,509 | 457,600 | 26,694 | 85,400 | 4,979 | | |
| Market, public, fall | 2,246,600 | 128,778 | 959,200 | 55,953 | 116,600 | 6,804 | | |
| Market, private, spring | 52,900 | 2,848 | | | 146,700 | 8,557 | 217,700 | 49,760 |
| Market, private, fall | 168,500 | 10,521 | | | 233,300 | 13,608 | 228,800 | 52,292 |
| Squid | | | | | | | 21,000 | 835 |
| Terrapin, diamond back | 2,000 | 900 | | | | | | |
| Total | 8,293,300 | 382,776 | 8,503,900 | 238,692 | 963,300 | 53,560 | 4,077,300 | 187,812 |

*Fisheries of Maryland, 1934*—Continued

SEED OYSTER FISHERY: BY GEAR

| Item | Oyster dredges | |
|---|---|---|
| OPERATING UNITS | *Number* | |
| Fishermen, on vessels | 4 | |
| Vessels, sail | 1 | |
| Net tonnage | 23 | |
| Apparatus, number | 2 | |
| Yards at mouth | 3 | |
| CATCH | *Bushels* | *Value* |
| Oysters, seed, public, spring | 3,000 | $360 |
| Oysters, seed, public, fall | 3,000 | 360 |
| Total | 6,000 | 720 |

NOTE.—Of the persons and gear employed in the seed oyster fishery all are duplicated among those in the market oyster fishery or fisheries for other species. The seed oyster fishery of Maryland was confined to Calvert County.

## VIRGINIA

*Fisheries of Virginia, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines, menhaden | Haul seines | Gill nets | | Lines | | Pound nets | Stop nets |
|---|---|---|---|---|---|---|---|---|
| | | | Drift | Stake | Trot with baits or snoods | Trot with hooks | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 1,102 | | | | | | | |
| On boats and shore: | | | | | | | | |
| Regular | | 275 | 66 | 126 | 968 | | 1,524 | 2 |
| Casual | | 294 | 460 | 189 | 475 | 1 | 514 | 2 |
| Total | 1,102 | 569 | 526 | 315 | 1,443 | 1 | 2,038 | 4 |
| Vessels: | | | | | | | | |
| Steam | 26 | | | | | | | |
| Net tonnage | 2,937 | | | | | | | |
| Motor | 6 | | | | | | | |
| Net tonnage | 446 | | | | | | | |
| Total vessels | 32 | | | | | | | |
| Total net tonnage | 3,383 | | | | | | | |
| Boats: | | | | | | | | |
| Motor | | 53 | 50 | 115 | 853 | | 391 | 2 |
| Other | | 154 | 264 | 68 | 484 | 1 | 455 | |
| Accessory boats | 96 | | | | | | | |
| Apparatus: | | | | | | | | |
| Number | 32 | 183 | 312 | 6,802 | 1,437 | 1 | 1,810 | 2 |
| Length, yards | 9,770 | 51,426 | | | | | | |
| Square yards | | | 214,266 | 390,811 | | | | 5,310 |
| Hooks, baits, or snoods | | | | | 1,075,280 | 100 | | |

| Item | Fyke nets | Dip nets | Otter trawls | Pots, eel | Scrapes | Dredges | |
|---|---|---|---|---|---|---|---|
| | | | | | | Crab | Oyster |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | 96 | | | 230 | 83 |
| On boats and shore: | | | | | | | |
| Regular | 53 | 971 | | 8 | 4 | 89 | 247 |
| Casual | 93 | 1,420 | | 3 | | | |
| Total | 146 | 2,391 | 96 | 11 | 4 | 319 | 330 |
| Vessels: | | | | | | | |
| Motor | | | 25 | | | 74 | 18 |
| Net tonnage | | | 361 | | | 712 | 274 |
| Boats: | | | | | | | |
| Motor | 40 | 110 | | 5 | | 31 | 140 |
| Other | 56 | 1,813 | | 6 | 4 | | |
| Apparatus: | | | | | | | |
| Number | 740 | 2,391 | 25 | 335 | 4 | 200 | 316 |
| Yards at mouth | | | 742 | | 4 | 347 | 356 |

*Fisheries of Virginia, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Tongs | | Rakes | | Picks | By hand | | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|
| | Oyster | Other | Oyster | Other | | Oysters | Other | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | |
| On vessels | 6 | | | | | | | 1,487 |
| On boats and shore: | | | | | | | | |
| Regular | 2,860 | 869 | 34 | 111 | 350 | 214 | 574 | 6,010 |
| Casual | 2,263 | 148 | | 10 | | 112 | 112 | 5,418 |
| Total | 5,129 | 1,017 | 34 | 121 | 350 | 326 | 686 | 12,915 |
| Vessels: | | | | | | | | |
| Steam | | | | | | | | |
| Net tonnage | | | | | | | | 26 |
| Motor | 2 | | | | | | | 2,937 |
| Net tonnage | 11 | | | | | | | 115 |
| | | | | | | | | 1,688 |
| Total vessels | 2 | | | | | | | 141 |
| Total net tonnage | 11 | | | | | | | 4,625 |
| Boats: | | | | | | | | |
| Motor | 2,508 | 500 | | 11 | 16 | 107 | 112 | 3,965 |
| Other | 684 | 171 | | 101 | 296 | 156 | 261 | 3,603 |
| Accessory boats | | | | | | | | 96 |
| Apparatus, number | 4,342 | 1,017 | 34 | 121 | 350 | | | |

CATCH: By gear

| Species | Purse seines | | Haul seines | | Gill nets | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Drift | | Stake | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | 191,400 | $2,203 | 46,000 | $883 | 7,500 | $33 |
| Bluefish | | | 146,400 | 3,575 | 1,000 | 28 | | |
| Butterfish | | | 2,400 | 48 | | | | |
| Carp | | | 146,900 | 6,895 | 900 | 32 | 400 | 16 |
| Catfish and bullheads | | | 75,500 | 2,624 | 1,300 | 44 | | |
| Croaker | | | 1,264,900 | 16,172 | 30,000 | 300 | 4,600 | 97 |
| Drum, red or redfish | | | 800 | 31 | | | | |
| Eels, common | | | 31,600 | 5,800 | | | | |
| Flounders | | | 6,300 | 216 | | | 2,500 | 100 |
| Gizzard shad | | | 35,100 | 443 | 20,000 | 50 | | |
| Hickory shad | | | 2,300 | 78 | 200 | 2 | | |
| Menhaden | 143,009,600 | $596,380 | | | | | | |
| Minnows | | | 56,600 | 3,081 | | | | |
| Mullet | | | 47,100 | 2,023 | 1,000 | 18 | 12,700 | 395 |
| Pigfish | | | 1,000 | 10 | | | | |
| Pike or pickerel | | | 1,200 | 120 | | | | |
| Shad | | | 13,000 | 1,579 | 213,500 | 20,269 | 299,200 | 30,554 |
| Spanish mackerel | | | 400 | 40 | | | | |
| Spot | | | 871,400 | 25,782 | 22,200 | 488 | 800 | 23 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | 156,800 | 5,315 | 1,000 | 30 | 2,200 | 127 |
| Spotted | | | 43,100 | 2,395 | 4,500 | 68 | | |
| Striped bass | | | 43,500 | 3,048 | 26,900 | 2,884 | 34,600 | 3,624 |
| Suckers | | | 12,000 | 300 | | | | |
| Sunfish | | | 24,000 | 600 | | | | |
| White perch | | | 48,600 | 2,165 | 300 | 24 | 300 | 13 |
| Yellow perch | | | 16,400 | 1,047 | | | 200 | 12 |
| Terrapin, diamond back | | | 500 | 30 | | | | |
| Turtles, snapper | | | 1,400 | 29 | | | | |
| Total | 143,009,600 | 596,380 | 3,240,600 | 85,649 | 368,800 | 25,120 | 365,000 | 34,994 |

*Fisheries of Virginia, 1934*—Continued

CATCH: By gear—Continued

| Species | Lines | | | | Pound nets | | Stop nets | |
|---|---|---|---|---|---|---|---|---|
| | Trot with baits or snoods | | Trot with hooks | | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | | | 5,540,300 | $35,354 | | |
| Bluefish | | | | | 786,200 | 38,204 | | |
| Bonito | | | | | 19,600 | 731 | | |
| Butterfish | | | | | 3,303,500 | 101,269 | | |
| Cabio or crab eater | | | | | 25,300 | 1,063 | | |
| Carp | | | | | 46,500 | 1,462 | 7,100 | $173 |
| Catfish and bullheads | | | 1,000 | $30 | 210,700 | 9,095 | 15,000 | 275 |
| Cod | | | | | 1,000 | 10 | | |
| Croaker | | | | | 15,700,100 | 166,118 | | |
| Cutlassfish | | | | | 1,900 | 5 | | |
| Drum: | | | | | | | | |
| Black | | | | | 37,500 | 750 | | |
| Red or redfish | | | | | 44,000 | 793 | | |
| Eels, common | | | | | 45,100 | 3,910 | | |
| Flounders | | | | | 472,200 | 18,515 | | |
| Gizzard shad | | | | | 33,500 | 650 | | |
| Harvestfish | | | | | 262,800 | 11,099 | | |
| Herring, sea | | | | | 361,400 | 2,638 | | |
| Hickory shad | | | | | 91,400 | 1,827 | | |
| King whiting or "kingfish" | | | | | 59,700 | 3,076 | | |
| Mackerel | | | | | 14,900 | 1,170 | | |
| Menhaden | | | | | 869,200 | 4,033 | | |
| Mullet | | | | | 23,600 | 369 | | |
| Pigfish | | | | | 7,300 | 136 | | |
| Scup | | | | | 32,900 | 790 | | |
| Sea bass | | | | | 11,100 | 180 | | |
| Shad | | | | | 3,543,300 | 258,144 | | |
| Spanish mackerel | | | | | 51,800 | 4,091 | | |
| Spot | | | | | 1,101,400 | 31,550 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | | | 12,950,800 | 239,328 | | |
| Spotted | | | | | 1,500 | 68 | | |
| Striped bass | | | | | 181,800 | 17,247 | | |
| Sturgeon | | | | | 4,200 | 663 | | |
| Thimble-eyed mackerel | | | | | 22,000 | 345 | | |
| White perch | | | | | 147,000 | 5,980 | | |
| Whiting | | | | | 3,000 | 38 | | |
| Yellow perch | | | | | 5,000 | 265 | | |
| Crabs, hard | 16,862,400 | $286,607 | | | | | | |
| Squid | | | | | 84,700 | 2,958 | | |
| Total | 16,862,400 | 286,607 | 1,000 | 30 | 46,103,200 | 963,924 | 22,100 | 448 |

| Species | Fyke nets | | Dip nets | | Otter trawls | | Pots, eel | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 60,100 | $478 | 900 | $22 | | | | |
| Bluefish | | | | | 2,900 | $168 | | |
| Butterfish | 1,500 | 51 | | | 26,900 | 1,075 | | |
| Carp | 49,700 | 2,114 | 100 | 3 | | | | |
| Catfish and bullheads | 205,100 | 8,801 | 300 | 7 | | | 900 | $63 |
| Cod | | | | | 500 | 15 | | |
| Croaker | 106,100 | 1,894 | | | 2,837,100 | 49,089 | | |
| Drum, red or redfish | | | | | 8,000 | 142 | | |
| Eels: | | | | | | | | |
| Common | 9,800 | 598 | | | | | 29,100 | 1,746 |
| Other | | | | | 2,100 | 39 | | |
| Flounders | 15,300 | 708 | | | 474,300 | 27,505 | | |
| Gizzard shad | 6,800 | 41 | | | | | | |
| Haddock | | | | | 500 | 4 | | |
| Hake | | | | | 21,400 | 284 | | |
| Hickory shad | | | 700 | 16 | | | | |
| King whiting or "kingfish" | | | | | 41,900 | 1,582 | | |
| Mackerel | | | | | 100 | 4 | | |
| Mullet | 600 | 18 | | | | | | |
| Pigfish | | | | | 600 | 13 | | |
| Pike or pickerel | 3,000 | 287 | | | | | | |
| Scup | | | | | 659,500 | 18,241 | | |
| Sea bass | | | | | 115,900 | 4,739 | | |
| Sea robin | | | | | 600 | 18 | | |
| Shad | 35,400 | 4,414 | | | | | | |
| Sharks | | | | | 20,200 | 483 | | |
| Skates | | | | | 10,100 | 80 | | |

*Fisheries of Virginia, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Fyke nets | | Dip nets | | Otter trawls | | Pots, eel | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Spot | | | | | 45,400 | $864 | | |
| Squeteagues or "sea trout", gray | 19,200 | $762 | | | 275,800 | 7,798 | | |
| Striped bass | 22,300 | 2,176 | | | 700 | 82 | | |
| Sturgeon | | | | | 4,100 | 416 | | |
| Suckers | 1,000 | 20 | 300 | $11 | | | | |
| Swellfish | | | | | 1,700 | 59 | | |
| Tautog | | | | | 500 | 7 | | |
| White perch | 116,900 | 4,460 | | | 2,300 | 28 | | |
| Whiting | | | | | 1,500 | 30 | | |
| Yellow perch | 29,100 | 2,120 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | | | 46,500 | 5,575 | 4,400 | 73 | | |
| Soft | | | 1,359,700 | 95,596 | | | | |
| Lobsters | | | | | 100 | 12 | | |
| Squid | | | | | 8,100 | 221 | | |
| Turtles, snapper | 2,000 | 80 | | | | | | |
| Total | 683,900 | 29,022 | 1,408,500 | 101,230 | 4,567,200 | 113,071 | 30,000 | $1,809 |

| Species | Scrapes | | Dredges | | | | Tongs | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Crab | | Oyster | | Oyster | | Other | |
| | *Lb.* | *Value* | *Lb.* | *Value* | *Lb.* | *Value* | *Lb.* | *Value* | *Lb.* | *Value* |
| Crabs: | | | | | | | | | | |
| Hard | 5,900 | $53 | 5,596,800 | $171,736 | | | | | | |
| Soft | 10,600 | 386 | | | | | | | | |
| Clams, hard, public | | | | | | | | | 1,614,700 | $149,818 |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | | | | | 4,783,300 | $291,642 | | |
| Market, public, fall | | | | | | | 5,217,500 | 312,563 | | |
| Market, private, spring | | | | | 2,451,800 | $181,550 | 2,882,900 | 183,559 | | |
| Market, private, fall | | | | | 3,851,800 | 276,983 | 2,369,300 | 141,808 | | |
| Scallops, sea | | | 1,300 | 896 | | | | | | |
| Total | 16,500 | 439 | 5,598,100 | 172,632 | 6,303,600 | 458,533 | 15,253,000 | 929,572 | 1,614,700 | 149,818 |

| Species | Rakes | | | | Picks | | By hand | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Oyster | | Other | | | | Oysters | | Other | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Clams, hard, public | | | 168,000 | $24,558 | 269,400 | $40,416 | | | 557,000 | $149,578 |
| Mussels | | | | | | | | | 23,400 | 540 |
| Oysters: | | | | | | | | | | |
| Market, private, spring | 102,000 | $1,700 | | | | | 54,100 | $3,156 | | |
| Market, private, fall | 102,000 | 3,700 | | | | | 54,100 | 3,157 | | |
| Terrapin, diamond back | | | | | | | | | 22,700 | 840 |
| Total | 204,000 | 5,400 | 168,000 | 24,558 | 269,400 | 40,416 | 108,200 | 6,313 | 603,100 | 150,958 |

*Fisheries of Virginia, 1934*—Continued

OPERATING UNITS: By counties

| Item | Accomac | Arlington | Caroline | Charles City | Chesterfield | Dinwiddie | Elizabeth City | Essex |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 6 | | | | | | 127 | |
| On boats and shore; | | | | | | | | |
| Regular | 1,260 | 4 | | 8 | | 5 | 120 | 39 |
| Casual | 274 | 10 | 3 | 118 | 22 | 6 | | 163 |
| Total | 1,540 | 14 | 3 | 126 | 22 | 11 | 247 | 202 |
| Vessels: | | | | | | | | |
| Motor | 2 | | | | | | 32 | |
| Net tonnage | 38 | | | | | | 417 | |
| Boats: | | | | | | | | |
| Motor | 626 | 7 | | 9 | | | 32 | 37 |
| Other | 583 | 1 | 3 | 62 | 13 | 5 | 12 | 71 |
| Apparatus: | | | | | | | | |
| Haul seines | 32 | | | 6 | 2 | 4 | | 2 |
| Length, yards | 14,010 | | | 1,225 | 300 | 420 | | 400 |
| Gill nets: | | | | | | | | |
| Drift | | 7 | 2 | 51 | 11 | 1 | | 4 |
| Square yards | | 16,450 | 800 | 18,335 | 3,360 | 520 | | 1,310 |
| Stake | 2 | | | 643 | | | | |
| Square yards | 720 | | | 19,640 | | | | |
| Lines, trot with baits or snoods | 193 | | | | | | 11 | 1 |
| Baits or snoods | 204,900 | | | | | | 3,450 | 250 |
| Pound nets | 208 | | | | | | 123 | 2 |
| Fyke nets | 4 | | 1 | 32 | 2 | 10 | 2 | 2 |
| Dip nets | 182 | | | | | 4 | | |
| Otter trawls | | | | | | | 11 | |
| Yards at mouth | | | | | | | 326 | |
| Pots, eel | | | | 10 | | | | |
| Scrapes | 4 | | | | | | | |
| Yards at mouth | 4 | | | | | | | |
| Dredges: | | | | | | | | |
| Crab | 25 | | | | | | 36 | |
| Yards at mouth | 28 | | | | | | 71 | |
| Oyster | 274 | | | | | | 6 | |
| Yards at mouth | 275 | | | | | | 9 | |
| Tongs: | | | | | | | | |
| Oyster | 875 | | | | | | 14 | 137 |
| Other | 317 | | | | | | 14 | |
| Rakes: | | | | | | | | |
| Oyster | 34 | | | | | | | |
| Other | 87 | | | | | | | |
| Picks | 350 | | | | | | | |

| Item | Fairfax | Gloucester | Henrico | Isle of Wight | James City | King and Queen | King George | King William |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | 23 | | 3 | | | | |
| On boats and shore: | | | | | | | | |
| Regular | 12 | 351 | | 336 | 29 | | 25 | |
| Casual | 46 | 40 | 87 | 34 | 70 | 87 | 102 | 93 |
| Total | 58 | 414 | 87 | 373 | 99 | 87 | 127 | 93 |
| Vessels: | | | | | | | | |
| Motor | | 8 | | 1 | | | | |
| Net tonnage | | 79 | | 5 | | | | |
| Boats: | | | | | | | | |
| Motor | 16 | 168 | | 179 | 23 | 12 | 71 | 3 |
| Other | 15 | 52 | 44 | 77 | 32 | 52 | 57 | 50 |
| Apparatus: | | | | | | | | |
| Haul seines | 3 | | 7 | 8 | 6 | 2 | 4 | 4 |
| Length, yards | 700 | | 196 | 1,600 | 1,200 | 400 | 950 | 390 |
| Gill nets: | | | | | | | | |
| Drift | 14 | | 35 | | 32 | 28 | 18 | 38 |
| Square yards | 29,400 | | 18,655 | | 19,140 | 17,640 | 7,200 | 18,876 |
| Stake | | 182 | | 2,655 | 1,142 | 590 | 20 | 110 |
| Square yards | | 4,540 | | 143,370 | 61,530 | 17,890 | 22,240 | 2,406 |
| Lines, trot with baits or snoods | | 52 | | 109 | | | 33 | 2 |
| Baits or snoods | | 28,200 | | 109,000 | | | 22,350 | 600 |
| Pound nets | | 97 | | 7 | 11 | | 39 | |
| Fyke nets | 236 | 5 | | 70 | 44 | 2 | 22 | 18 |
| Pots, eel | | | 6 | | | | | |
| Dredges: | | | | | | | | |
| Crab | | 16 | | | | | | |
| Yards at mouth | | 30 | | | | | | |
| Oyster | | 2 | | | | | | |
| Yards at mouth | | 3 | | | | | | |
| Tongs: | | | | | | | | |
| Oyster | | 179 | | 338 | 6 | 6 | 32 | 17 |
| Other | | 186 | | | 6 | | | |

*Fisheries of Virginia, 1934*—Continued

OPERATING UNITS: BY COUNTIES—Continued

| Item | Lancaster | Mathews | Middlesex | Nansemond | New Kent | Norfolk | Northampton | Northumberland |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 472 | 23 | 6 | 3 | | 30 | | 645 |
| On boats and shore: | | | | | | | | |
| Regular | 458 | 375 | 492 | 47 | 2 | 118 | 447 | 919 |
| Casual | 868 | 381 | 873 | 141 | 65 | 106 | 219 | 796 |
| Total | 1,798 | 779 | 1,371 | 191 | 67 | 254 | 666 | 2,358 |
| Vessels: | | | | | | | | |
| Steam | 8 | | | | | | | 18 |
| Net tonnage | 820 | | | | | | | 2,117 |
| Motor | 10 | 6 | 2 | 1 | | 5 | | 1 |
| Net tonnage | 397 | 87 | 21 | 6 | | 103 | | 117 |
| Total vessels | 18 | 6 | 2 | 1 | | 5 | | 19 |
| Total net tonnage | 1,217 | 87 | 21 | 6 | | 103 | | 2,234 |
| Boats: | | | | | | | | |
| Motor | 578 | 268 | 611 | 76 | 3 | 50 | 256 | 381 |
| Other | 320 | 140 | 71 | 71 | 44 | 75 | 119 | 1,232 |
| Accessory boats | 39 | | | | | | | 57 |
| Apparatus: | | | | | | | | |
| Purse seines, menhaden | 13 | | | | | | | 19 |
| Length, yards | 4,190 | | | | | | | 5,580 |
| Haul seines | | 4 | 6 | | 13 | 15 | 19 | 2 |
| Length, yards | | 1,500 | 2,750 | | 2,095 | 4,500 | 5,300 | 100 |
| Gill nets: | | | | | | | | |
| Drift | | | | | 31 | | | 3 |
| Square yards | | | | | 24,800 | | | 2,880 |
| Stake | | | | 650 | 1 | 112 | | |
| Square yards | | | | 32,500 | 200 | 3,360 | | |
| Lines, trot with baits or snoods | 83 | 75 | 65 | 63 | | 79 | 164 | 221 |
| Baits or snoods | 44,690 | 72,050 | 52,000 | 44,100 | | 39,500 | 101,000 | 160,200 |
| Trot with hooks | | | | | 1 | | | |
| Hooks | | | | | 100 | | | |
| Pound nets | 198 | 402 | 14 | | | 20 | 155 | 378 |
| Fyke nets | | | | 10 | 16 | | 3 | |
| Dip nets | 650 | | 65 | | | | 100 | 1,310 |
| Otter trawls | | 1 | | | | 1 | | |
| Yards at mouth | | 30 | | | | 30 | | |
| Dredges: | | | | | | | | |
| Crab | | 10 | 2 | | | | 21 | |
| Yards at mouth | | 20 | 4 | | | | 21 | |
| Oyster | 16 | 4 | 2 | | | 8 | | |
| Yards at mouth | 42 | 6 | 3 | | | 12 | | |
| Tongs: | | | | | | | | |
| Oyster | 571 | 186 | 722 | 164 | 1 | | 1 | 245 |
| Other | | 12 | | 162 | | 47 | 32 | |
| Picks | | | | | | | 34 | |

| Item | Prince George | Princess Anne | Prince William | Richmond | Stafford | Surry | Warwick | Westmoreland | York |
|---|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | | | 4 | | 145 |
| On boats and shore: | | | | | | | | | |
| Regular | 6 | 102 | 12 | 52 | 38 | 17 | 196 | 156 | 364 |
| Casual | 38 | 19 | 38 | 138 | 23 | 10 | 153 | 393 | 2 |
| Total | 44 | 121 | 50 | 190 | 61 | 27 | 353 | 549 | 511 |
| Vessels: | | | | | | | | | |
| Motor | | | | | | | 1 | | 46 |
| Net tonnage | | | | | | | 16 | | 402 |
| Boats: | | | | | | | | | |
| Motor | 8 | 16 | 13 | 37 | 16 | 16 | 164 | 84 | 183 |
| Other | 20 | 47 | 12 | 89 | 20 | 7 | 5 | 183 | 19 |
| Apparatus: | | | | | | | | | |
| Haul seines | 6 | 6 | 7 | | 9 | 4 | | 4 | 8 |
| Length, yards | 3,350 | 1,800 | 1,270 | | 1,550 | 1,000 | | 700 | 3,720 |
| Gill nets: | | | | | | | | | |
| Drift | 12 | | 6 | 13 | 1 | 2 | | | 3 |
| Square yards | 9,720 | | 12,680 | 5 200 | 4,100 | 2,000 | | | 1,200 |
| Stake | 50 | | 24 | | 96 | 260 | 263 | 2 | |
| Square yards | 200 | | 10,340 | | 39,460 | 23,400 | 7,890 | 1,125 | |

*Fisheries of Virginia, 1934*—Continued

OPERATING UNITS: By counties—Continued

| Item | Prince George | Princess Anne | Prince William | Richmond | Stafford | Surry | Warwick | Westmoreland | York |
|---|---|---|---|---|---|---|---|---|---|
| Apparatus—Continued. | | | | | | | | | |
| Lines, trot with baits | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| or snoods | | 33 | | 10 | 6 | 2 | 17 | 150 | 68 |
| Baits or snoods | | 8,250 | | 2,850 | 3,040 | 1,500 | 8,500 | 106,350 | 62,500 |
| Pound nets | | 28 | | 25 | | | 22 | 56 | 25 |
| Stop nets | 2 | | | | | | | | |
| Square yards | 5,310 | | | | | | | | |
| Fyke nets | 46 | | 143 | 1 | 42 | 15 | 3 | 11 | |
| Dip nets | | | | | | | | 80 | |
| Otter trawls | | | | | | | 1 | | 11 |
| Yards at mouth | | | | | | | 30 | | 326 |
| Pots, eel | | | | | 319 | | | | |
| Dredges: | | | | | | | | | |
| Crab | | | | | | | | | 90 |
| Yards at mouth | | | | | | | | | 173 |
| Oyster | | | | | | | | | 4 |
| Yards at mouth | | | | | | | | | 6 |
| Tongs: | | | | | | | | | |
| Oyster | | 15 | | 126 | | | 307 | 160 | 240 |
| Other | | 1 | | | | | | | 240 |

CATCH: By counties

| Species | Accomac | | Arlington | | Caroline | | Charles City | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 798,400 | $3,489 | | | | | 3,800 | $38 |
| Bluefish | 22,600 | 1,136 | | | | | | |
| Bonito | 17,400 | 620 | | | | | | |
| Butterfish | 853,300 | 22,163 | | | | | | |
| Carp | | | | | | | 19,400 | 631 |
| Catfish and bullheads | | | | | 200 | $8 | 30,500 | 2,086 |
| Croaker | 1,690,900 | 26,974 | | | | | | |
| Drum: | | | | | | | | |
| Black | 37,500 | 750 | | | | | | |
| Red or redfish | 41,200 | 752 | | | | | | |
| Eels, common | 25,000 | 2,500 | | | 200 | 10 | 1,300 | 70 |
| Flounders | 78,000 | 2,557 | | | | | | |
| Harvestfish | 6,400 | 256 | | | | | | |
| Hickory shad | | | | | | | 500 | 20 |
| King whiting or "kingfish" | 6,500 | 275 | | | | | | |
| Mackerel | 800 | 40 | | | | | | |
| Mullet | 10,000 | 677 | | | | | 100 | 2 |
| Pigfish | 1,000 | 10 | | | | | | |
| Pike or pickerel | | | | | | | 100 | 10 |
| Scup | 22,000 | 573 | | | | | | |
| Shad | 155,400 | 10,949 | 13,200 | $926 | 400 | 70 | 68,600 | 7,024 |
| Spanish mackerel | 9,400 | 629 | | | | | | |
| Spot | 105,100 | 2,922 | | | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 1,973,500 | 51,408 | | | | | | |
| Spotted | 1,400 | 70 | | | | | | |
| Striped bass | 1,500 | 130 | | | 200 | 35 | 3,100 | 306 |
| Sturgeon | 1,900 | 318 | | | | | | |
| Thimble-eyed mackerel | 12,000 | 245 | | | | | | |
| White perch | 500 | 16 | | | 500 | 25 | 900 | 50 |
| Whiting | 3,000 | 38 | | | | | | |
| Yellow perch | | | | | 100 | 3 | 100 | 5 |
| Crabs: | | | | | | | | |
| Hard | 3,064,900 | 64,572 | | | | | | |
| Soft | 582,700 | 31,177 | | | | | | |
| Clams, hard, public | 1,458,800 | 125,740 | | | | | | |
| Mussels | 23,400 | 540 | | | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 603,300 | 31,533 | | | | | | |
| Market, public, fall | 713,700 | 37,222 | | | | | | |
| Market, private, spring | 1,240,400 | 92,740 | | | | | | |
| Market, private, fall | 1,120,500 | 87,750 | | | | | | |
| Squid | 32,300 | 1,385 | | | | | | |
| Terrapin, diamond back | 200 | 90 | | | | | | |
| Total | 14,714,900 | 602,246 | 13,200 | 926 | 1,600 | 151 | 128,400 | 10,242 |

*Fisheries of Virginia, 1934*—Continued

CATCH: By counties—Continued

| Species | Chesterfield | | Dinwiddie | | Elizabeth City | | Essex | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 3,300 | $66 | 44,900 | $662 | 110,000 | $1,373 | 6,000 | $140 |
| Bluefish | | | | | 136,800 | 6,179 | | |
| Butterfish | | | | | 180,200 | 8,708 | | |
| Cabio or crab eater | | | | | 3,500 | 175 | | |
| Carp | 3,000 | 148 | 4,600 | 193 | | | 2,600 | 99 |
| Catfish and bullheads | 2,300 | 81 | 5,800 | 194 | 6,200 | 310 | 5,100 | 194 |
| Cod | | | | | 200 | 6 | | |
| Croaker | | | | | 5,374,300 | 88,787 | 13,000 | 350 |
| Drum, red or redfish | | | | | 6,300 | 118 | | |
| Eels: | | | | | | | | |
| Common | | | | | 200 | 16 | 400 | 16 |
| Conger | | | | | 1,900 | 37 | | |
| Flounders | | | | | 382,400 | 21,049 | | |
| Gizzard shad | | | | | 2,700 | 52 | 11,000 | 190 |
| Haddock | | | | | 500 | 4 | | |
| Hake | | | | | 16,400 | 211 | | |
| Harvestfish | | | | | 135,500 | 6,775 | | |
| Hickory shad | 500 | 25 | 700 | 16 | 16,900 | 785 | 100 | 4 |
| King whiting or "kingfish" | | | | | 22,900 | 822 | | |
| Minnows | | | 49,600 | 1,238 | | | | |
| Mullet | 200 | 8 | | | 23,600 | 369 | | |
| Pigfish | | | | | 200 | 5 | | |
| Scup | | | | | 421,400 | 11,485 | | |
| Sea bass | | | | | 81,000 | 2,801 | | |
| Sea robin | | | | | 500 | 17 | | |
| Shad | 4,000 | 381 | 3,000 | 250 | 281,000 | 27,800 | 2,700 | 555 |
| Sharks | | | | | 9,400 | 244 | | |
| Skates | | | | | 9,300 | 76 | | |
| Spanish mackerel | | | | | 18,800 | 1,504 | | |
| Spot | | | | | 302,500 | 13,369 | 1,500 | 60 |
| Squeteagues or "sea trout", gray | | | | | 3,044,400 | 77,133 | | |
| Striped bass | | | | | 27,000 | 2,180 | 900 | 85 |
| Sturgeon | | | | | 5,100 | 654 | | |
| Suckers | | | 300 | 11 | | | | |
| White perch | 200 | 10 | | | 31,200 | 609 | 4,800 | 306 |
| Whiting | | | | | 900 | 15 | | |
| Yellow perch | | | | | 4,500 | 280 | 1,500 | 80 |
| Crabs, hard | | | | | 1,728,400 | 40,081 | 9,600 | 160 |
| Lobsters | | | | | 100 | 12 | | |
| Clams, hard, public | | | | | 8,400 | 1,575 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | 75,600 | 3,780 | 187,300 | 12,425 |
| Market, public, fall | | | | | 75,600 | 3,780 | 187,200 | 12,425 |
| Market, private, spring | | | | | 305,200 | 26,814 | 45,000 | 4,200 |
| Market, private, fall | | | | | 734,000 | 64,484 | 45,000 | 4,200 |
| Scallops, sea | | | | | 1,300 | 896 | | |
| Squid | | | | | 4,200 | 110 | | |
| Terrapin, diamond back | | | | | 22,500 | 750 | | |
| Total | 13,500 | 709 | 108,900 | 2,564 | 13,613,100 | 416,230 | 523,700 | 35,489 |

| Species | Fairfax | | Gloucester | | Henrico | | Isle of Wight | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | 18,000 | $89 | 5,800 | $53 | 38,000 | $205 |
| Bluefish | | | 96,000 | 3,840 | | | | |
| Butterfish | | | 271,500 | 5,430 | | | 3,700 | 118 |
| Cabio or crab eater | | | 800 | 48 | | | | |
| Carp | 7,900 | $316 | 300 | 15 | 5,100 | 255 | 7,800 | 242 |
| Catfish and bullheads | 93,900 | 3,756 | 700 | 22 | 4,200 | 184 | 11,000 | 225 |
| Croaker | | | 1,340,500 | 16,749 | | | 54,100 | 1,069 |
| Eels, common | | | 700 | 49 | 400 | 40 | 1,400 | 84 |
| Flounders | | | 17,000 | 675 | | | 6,300 | 242 |
| Gizzard shad | 300 | 3 | | | | | 5,400 | 27 |
| Harvestfish | | | 41,800 | 2,090 | | | | |
| King whiting or "kingfish" | | | 20,300 | 406 | | | | |
| Menhaden | | | 69,000 | 230 | | | | |
| Minnows | | | | | 200 | 135 | | |
| Mullet | | | 700 | 21 | | | 27,400 | 736 |
| Shad | 51,100 | 3,575 | 158,100 | 16,090 | 13,500 | 2,160 | 79,700 | 12,953 |
| Spanish mackerel | | | 1,500 | 150 | | | | |
| Spot | | | 36,000 | 1,082 | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | 1,336,300 | 20,062 | | | 9,600 | 480 |
| Spotted | | | 1,000 | 60 | | | | |
| Striped bass | 6,000 | 600 | 500 | 40 | | | 7,300 | 864 |

*Fisheries of Virginia, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Fairfax | | Gloucester | | Henrico | | Isle of Wight | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| White perch | 51,100 | $1,536 | | | | | 35,000 | $1,400 |
| Yellow perch | 15,400 | 1,506 | | | | | | |
| Crabs, hard | | | 2,342,000 | $47,102 | | | 784,800 | 11,445 |
| Clams, hard, public | | | 212,600 | 31,432 | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | 441,200 | 29,412 | | | 245,000 | 13,700 |
| Market, public, fall | | | 408,400 | 27,224 | | | 254,000 | 15,210 |
| Market, private, spring | | | 30,000 | 2,500 | | | 3,000 | 180 |
| Market, private, fall | | | 30,000 | 2,500 | | | 5,000 | 300 |
| Total | 225,700 | 11,292 | 6,874,900 | 207,318 | 29,200 | $2,827 | 1,578,500 | 59,480 |

| Species | James City | | King and Queen | | King George | | King William | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 18,700 | $266 | 800 | $16 | 26,700 | $287 | 25,100 | $253 |
| Butterfish | | | | | 4,300 | 93 | | |
| Carp | 41,300 | 1,901 | 200 | 8 | 4,500 | 102 | 500 | 20 |
| Catfish and bullheads | 13,800 | 407 | 1,200 | 36 | 170,100 | 8,335 | 1,100 | 30 |
| Croaker | 10,500 | 246 | 200 | 3 | 200 | 2 | 500 | 5 |
| Eels, common | | | | | 8,800 | 352 | | |
| Flounders | 1,100 | 55 | | | | | | |
| Gizzard shad | | | | | 9,200 | 162 | | |
| Hickory shad | | | 1,000 | 30 | 100 | 5 | 300 | 3 |
| Mullet | | | 1,500 | 51 | | | 700 | 11 |
| Pike or pickerel | | | | | 400 | 35 | | |
| Shad | 57,500 | 6,900 | 14,100 | 1,745 | 38,100 | 3,500 | 9,200 | 1,076 |
| Squeteagues or "sea trout", gray | 2,700 | 162 | | | 99,000 | 2,970 | | |
| Striped bass | 14,300 | 1,494 | 700 | 72 | 56,100 | 5,642 | 700 | 88 |
| White perch | 8,700 | 348 | 700 | 28 | 60,000 | 3,028 | 300 | 12 |
| Yellow perch | | | | | 3,100 | 103 | | |
| Crabs, hard | | | | | 457,500 | 10,813 | 10,000 | 200 |
| Clams, hard, public | 7,200 | 1,350 | | | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 7,300 | 291 | 21,600 | 360 | 44,200 | 1,657 | 3,600 | 60 |
| Market, public, fall | 14,600 | 782 | | | 56,800 | 2,129 | | |
| Market, private, spring | | | | | | | 99,600 | 1,660 |
| Market, private, fall | | | | | | | 99,600 | 1,660 |
| Terrapin, diamond back | 500 | 30 | | | | | | |
| Turtles, snapper | 1,400 | 29 | | | | | | |
| Total | 199,600 | 14,261 | 42,000 | 2,349 | 1,039,100 | 39,215 | 251,200 | 5,078 |

| Species | Lancaster | | Mathews | | Middlesex | | Nansemond | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 134,300 | $1,343 | 543,400 | $2,971 | 7,000 | $60 | 5,000 | $50 |
| Bluefish | 900 | 36 | 483,500 | 21,684 | 12,000 | 730 | | |
| Butterfish | 6,200 | 186 | 671,400 | 23,474 | | | | |
| Cabio or crab eater | | | 21,000 | 840 | | | | |
| Carp | | | | | 4,000 | 120 | | |
| Catfish and bullheads | | | | | 200 | 10 | | |
| Croaker | 745,000 | 14,900 | 4,836,000 | 25,980 | 190,000 | 2,870 | 12,000 | 358 |
| Eels, common | | | | | | | 500 | 30 |
| Flounders | 900 | 51 | 120,300 | 3,811 | | | 10,000 | 500 |
| Hake | | | 3,700 | 55 | | | | |
| Harvestfish | | | 10,500 | 263 | | | | |
| Hickory shad | 600 | 18 | 15,200 | 312 | | | | |
| King whiting or "kingfish" | | | 400 | 21 | | | | |
| Menhaden | 54,808,600 | 241,261 | 120,000 | 300 | | | | |
| Pigfish | | | 6,300 | 126 | | | | |
| Scup | | | 87,200 | 2,401 | | | | |
| Sea bass | | | 17,500 | 684 | | | | |
| Shad | 44,900 | 4,490 | 2,064,700 | 118,930 | 2,000 | 160 | 8,800 | 1,316 |
| Spanish mackerel | | | 400 | 40 | | | | |
| Spot | 15,300 | 459 | 597,000 | 13,435 | 155,500 | 2,550 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 46,100 | 1,383 | 2,559,300 | 39,629 | 38,500 | 1,230 | 700 | 52 |
| Spotted | | | 5,100 | 255 | | | | |
| Striped bass | 6,000 | 1,075 | 22,600 | 855 | 13,000 | 1,030 | 1,000 | 100 |
| White perch | | | 4,400 | 132 | | | 2,500 | 50 |

*Fisheries of Virginia, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Lancaster | | Mathews | | Middlesex | | Nansemond | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Whiting | | | 300 | $6 | | | | |
| Yellow perch | | | | | | | 5,000 | $250 |
| Crabs: | | | | | | | | |
| Hard | 968,500 | $32,450 | 1,157,500 | 20,270 | 706,800 | $9,680 | 544,000 | 9,072 |
| Soft | 196,700 | 18,200 | | | 77,700 | 7,800 | | |
| Clams, hard, public | | | 8,600 | 1,620 | | | 47,000 | 11,740 |
| Oysters: | | | | | | | | |
| Market, public, spring | 984,800 | 65,651 | 111,600 | 7,001 | 954,500 | 63,946 | 37,800 | 2,205 |
| Market, public, fall | 1,094,000 | 69,289 | 237,500 | 14,054 | 954,500 | 63,946 | 289,800 | 16,905 |
| Market, private, spring | 1,626,000 | 108,520 | 92,700 | 6,448 | 382,000 | 27,800 | 27,000 | 1,575 |
| Market, private, fall | 595,600 | 39,023 | 136,000 | 9,083 | 364,000 | 26,000 | 81,000 | 4,725 |
| Total | 61,274,400 | 598,335 | 13,934,100 | 314,680 | 3,861,700 | 207,932 | 1,072,100 | 48,928 |

| Species | New Kent | | Norfolk | | Northampton | | Northumberland | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 74,000 | $1,068 | 80,500 | $402 | | | 2,858,500 | $18,550 |
| Bluefish | | | 10,000 | 500 | 28,100 | $1,863 | 59,900 | 2,392 |
| Bonito | | | | | 2,200 | 111 | | |
| Butterfish | | | 300,200 | 9,006 | 824,300 | 25,076 | 17,300 | 519 |
| Carp | 11,000 | 440 | | | | | | |
| Catfish and bullheads | 11,800 | 331 | | | | | | |
| Cod | | | | | 1,000 | 10 | | |
| Croaker | 34,500 | 345 | 1,420,000 | 10,669 | 611,600 | 6,904 | 477,700 | 6,913 |
| Cutlassfish | | | | | 1,900 | 5 | | |
| Drum, red or redfish | | | 800 | 16 | | | 1,900 | 38 |
| Eels, common | 100 | 3 | | | 41,000 | 6,850 | | |
| Flounders | | | 50,100 | 2,004 | 31,600 | 1,496 | 4,500 | 147 |
| Gizzard shad | 30,100 | 166 | | | | | 600 | 3 |
| Harvestfish | | | 28,600 | 715 | | | | |
| Herring, sea | | | | | 361,400 | 2,638 | | |
| Hickory shad | 200 | 2 | | | | | 14,900 | 183 |
| King whiting or "kingfish" | | | 2,500 | 125 | 5,400 | 270 | | |
| Mackerel | | | | | 14,100 | 1,130 | | |
| Menhaden | | | | | | | 88,881,200 | 358,622 |
| Minnows | 6,800 | 1,708 | | | | | | |
| Mullet | | | 6,300 | 126 | 12,000 | 690 | | |
| Scup | | | | | 10,500 | 209 | | |
| Sea bass | | | | | 1,500 | 77 | | |
| Sea robin | | | 100 | 1 | | | | |
| Shad | 15,000 | 1,817 | 154,400 | 15,440 | 6,600 | 518 | 451,700 | 40,649 |
| Sharks | | | 4,300 | 63 | | | | |
| Spanish mackerel | | | 17,800 | 1,424 | 2,500 | 204 | | |
| Spot | | | 296,400 | 11,158 | 21,300 | 593 | 7,100 | 186 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 9,000 | 270 | 391,700 | 5,966 | 2,267,800 | 21,605 | 217,200 | 3,795 |
| Spotted | | | 9,000 | 450 | | | 5,000 | 76 |
| Striped bass | 800 | 64 | 2,100 | 168 | 600 | 120 | 37,800 | 2,978 |
| Thimble-eyed mackerel | | | | | 10,000 | 100 | | |
| White perch | 5,100 | 287 | | | | | 300 | 3 |
| Yellow perch | 500 | 39 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | | | 995,400 | 16,590 | 1,710,000 | 40,000 | 2,936,800 | 29,368 |
| Soft | | | | | 143,100 | 8,100 | 352,200 | 29,205 |
| Clams, hard, public | | | 56,400 | 1,763 | 499,500 | 139,870 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 1,300 | 108 | | | | | 188,800 | 9,088 |
| Market, public, fall | 1,300 | 108 | | | | | 273,400 | 12,613 |
| Market, private, spring | | | 1,062,500 | 64,099 | 56,100 | 3,296 | 217,700 | 11,133 |
| Market, private, fall | | | 2,129,000 | 128,527 | 56,100 | 3,297 | 386,900 | 18,183 |
| Squid | | | 800 | 19 | 52,400 | 1,573 | | |
| Turtles, snapper | 2,000 | 80 | | | | | | |
| Total | 203,500 | 6,836 | 7,018,900 | 269,231 | 6,772,600 | 266,605 | 97,391,400 | 544,644 |

*Fisheries of Virginia, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Prince George | | Princess Anne | | Prince William | | Richmond | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 6,900 | $97 | 104,000 | $710 | 8,200 | $41 | 41,800 | $850 |
| Bluefish | | | 14,000 | 1,400 | | | | |
| Butterfish | | | 168,000 | 6,720 | | | 29,000 | 580 |
| Carp | 28,700 | 1,033 | 12,000 | 600 | 17,500 | 875 | 38,200 | 1,146 |
| Catfish and bullheads | 43,000 | 943 | 2,800 | 84 | 39,900 | 1,673 | 34,200 | 684 |
| Croaker | | | 1,680,000 | 15,550 | | | 16,000 | 480 |
| Drum, red or redfish | | | 1,000 | 20 | | | | |
| Eels, common | 1,200 | 58 | 3,000 | 90 | | | 700 | 36 |
| Flounders | | | 70,000 | 2,800 | | | | |
| Gizzard shad | | | | | 14,000 | 140 | 22,000 | 440 |
| Harvestfish | | | 40,000 | 1,000 | | | | |
| Hickory shad | | | | | | | 2,800 | 112 |
| King whiting or "kingfish" | | | 25,000 | 2,000 | | | | |
| Mullet | 600 | 36 | | | 1,400 | 56 | | |
| Pike or pickerel | 200 | 12 | | | 1,400 | 140 | | |
| Shad | 16,300 | 1,498 | 177,100 | 17,710 | 31,700 | 2,203 | 12,400 | 2,480 |
| Spanish mackerel | | | 1,800 | 180 | | | | |
| Spot | | | 143,600 | 5,766 | | | 1,000 | 60 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | 606,000 | 9,750 | | | | |
| Spotted | | | 3,600 | 180 | | | | |
| Striped bass | 900 | 76 | | | 27,200 | 3,086 | 7,800 | 780 |
| Suckers | | | 12,000 | 300 | | | | |
| Sunfish | | | 24,000 | 600 | | | | |
| White perch | 1,200 | 57 | 10,200 | 204 | 21,000 | 1,050 | 18,500 | 848 |
| Yellow perch | 800 | 36 | | | 6,300 | 315 | 200 | 5 |
| Crabs, hard | | | 416,800 | 6,930 | | | 85,800 | 1,430 |
| Clams, hard, public | | | 800 | 200 | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | | | 151,200 | 12,930 |
| Market, public, fall | | | | | | | 151,200 | 12,930 |
| Market, private, spring | | | 28,000 | 1,600 | | | 115,500 | 8,250 |
| Market, private, fall | | | 56,000 | 3,200 | | | 115,500 | 8,250 |
| Total | 99,800 | 3,846 | 3,599,700 | 77,594 | 168,600 | 9,579 | 843,800 | 52,291 |

| Species | Stafford | | Surry | | Warwick | | Westmoreland | | York | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | 8,400 | $126 | 800 | $8 | 840,000 | $5,600 | 33,900 | $170 |
| Bluefish | | | | | | | | | 72,700 | 2,215 |
| Butterfish | | | | | 4,000 | 111 | | | 5,900 | 259 |
| Carp | 7,300 | $418 | 28,900 | 1,726 | | | 6,800 | 407 | | |
| Catfish and bullheads | 11,000 | 690 | 6,500 | 195 | | | 14,300 | 461 | | |
| Cod | | | | | 100 | 7 | | | 200 | 2 |
| Croaker | | | | | 434,500 | 5,334 | 26,300 | 395 | 975,000 | 8,787 |
| Drum, red or redfish | | | | | 500 | 5 | | | 1,100 | 17 |
| Eels: | | | | | | | | | | |
| Common | 28,600 | 1,716 | 1,000 | 80 | | | 1,100 | 54 | | |
| Conger | | | | | 100 | 1 | | | 100 | 1 |
| Flounders | | | | | 41,900 | 2,373 | | | 156,500 | 9,284 |
| Gizzard shad | | | | | | | 100 | 1 | | |
| Hake | | | | | 1,200 | 15 | | | 100 | 3 |
| Hickory shad | | | | | 600 | 6 | 40,200 | 402 | | |
| King whiting or "kingfish" | | | | | 2,200 | 65 | | | 16,400 | 674 |
| Mackerel | | | | | | | | | 100 | 4 |
| Mullet | | | | | | | | | 500 | 40 |
| Pigfish | | | | | 300 | 4 | | | 1,100 | 14 |
| Pike or pickerel | 2,000 | 200 | | | | | 100 | 10 | | |
| Scup | | | | | 108,500 | 3,427 | | | 42,800 | 936 |
| Sea bass | | | | | 26,500 | 1,334 | | | 500 | 23 |
| Shad | 54,500 | 3,818 | 6,100 | 948 | 61,600 | 2,904 | 28,500 | 2,275 | 18,500 | 1,850 |
| Sharks | | | | | 2,400 | 58 | | | 4,100 | 118 |
| Skates | | | | | 800 | 4 | | | | |
| Spot | | | | | 3,900 | 114 | | | 355,000 | 6,953 |
| Squeteagues or "sea trout": | | | | | | | | | | |
| Gray | | | | | 39,000 | 703 | 392,500 | 11,775 | 372,500 | 4,987 |
| Spotted | | | | | | | | | 24,000 | 1,440 |
| Striped bass | 3,600 | 396 | 3,800 | 304 | 3,600 | 272 | 60,700 | 6,221 | | |
| Sturgeon | | | | | 1,100 | 88 | | | 200 | 19 |
| Suckers | 1,000 | 20 | | | | | | | | |
| Swellfish | | | | | 100 | 6 | | | 1,600 | 53 |
| Tautog | | | | | 100 | 1 | | | 400 | 6 |

*Fisheries of Virginia, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Stafford | | Surry | | Warwick | | Westmoreland | | York | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| White perch | 12,500 | $750 | 1,500 | $60 | 6,100 | $164 | 37,600 | $1,688 | 600 | $9 |
| Whiting | | | | | | | | | 300 | 9 |
| Yellow perch | 12,600 | 804 | | | | | 600 | 18 | | |
| Crabs: | | | | | | | | | | |
| Hard | 14,900 | 576 | 600 | 8 | 72,700 | 914 | 606,600 | 9,288 | 3,902,400 | 113,095 |
| Soft | | | | | | | 17,900 | 1,500 | | |
| Clams, hard, public | | | | | | | | | 309,800 | 49,080 |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | | | 96,000 | 3,520 | 60,200 | 3,611 | 568,000 | 30,364 |
| Market, public, fall | | | | | 192,000 | 7,040 | 6,000 | 352 | 307,500 | 16,554 |
| Market, private, spring | | | | | 12,600 | 462 | 1,500 | 88 | 146,000 | 8,600 |
| Market, private, fall | | | | | 25,200 | 924 | 240,700 | 14,442 | 157,000 | 9,100 |
| Squid | | | | | 1,600 | 45 | | | 1,500 | 47 |
| Total | 148,000 | 9,388 | 56,800 | 3,447 | 1,140,000 | 29,909 | 2,381,700 | 58,588 | 7,476,300 | 264,713 |

SEED OYSTER FISHERY: BY GEAR

| Item | Dredges | | Tongs | | Total, exclusive of duplication | |
|---|---|---|---|---|---|---|
| OPERATING UNITS | | | | | | |
| Fishermen: | *Number* | | *Number* | | *Number* | |
| On vessels | 16 | | 8 | | 24 | |
| On boats and shore: | | | | | | |
| Regular | | | 1,005 | | 1,005 | |
| Casual | | | 120 | | 120 | |
| Total | 16 | | 1,133 | | 1,149 | |
| Vessels: | | | | | | |
| Motor | 4 | | 3 | | 7 | |
| Net tonnage | 48 | | 21 | | 69 | |
| Boats: | | | | | | |
| Motor | | | 558 | | 558 | |
| Other | | | 36 | | 36 | |
| Apparatus: | | | | | | |
| Number | 8 | | 1,131 | | | |
| Yards at mouth | 16 | | | | | |
| CATCH | | | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public, spring | | | 1,153,083 | $173,664 | 1,153,083 | $173,664 |
| Seed, public, fall | | | 864,342 | 130,348 | 864,342 | 130,348 |
| Seed, private, spring | 32,868 | $1,643 | | | 32,868 | 1,643 |
| Seed, private, fall | 32,868 | 1,644 | | | 32,868 | 1,644 |
| Total | 65,736 | 3,287 | 2,017,425 | 304,012 | 2,083,161 | 307,299 |

*Fisheries of Virginia, 1934*—Continued

SEED OYSTER FISHERY: BY COUNTIES

| Item | Accomac | | Elizabeth City | | Gloucester | | Isle of Wight | |
|---|---|---|---|---|---|---|---|---|
| OPERATING UNITS | | | | | | | | |
| Fishermen: | *Number* | | *Number* | | *Number* | | *Number* | |
| On vessels | | | 16 | | | | 3 | |
| On boats and shore: | | | | | | | | |
| Regular | 77 | | 14 | | 124 | | 336 | |
| Total | 77 | | 30 | | 124 | | 339 | |
| Vessels: | | | | | | | | |
| Motor | | | 4 | | | | 1 | |
| Net tonnage | | | 48 | | | | 5 | |
| Boats: | | | | | | | | |
| Motor | 25 | | 10 | | 85 | | 163 | |
| Other | | | | | | | 30 | |
| Apparatus: | | | | | | | | |
| Tongs | 77 | | 14 | | 124 | | 338 | |
| Dredges | | | 8 | | | | | |
| Yards at mouth | | | 16 | | | | | |
| CATCH | | | | | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public, spring | 5,400 | $1,508 | 33,600 | $5,040 | 213,750 | $32,064 | 506,500 | $75,975 |
| Seed, public, fall | 5,400 | 1,507 | 25,200 | 3,780 | 122,250 | 18,336 | 505,500 | 75,825 |
| Seed, private, spring | | | 32,868 | 1,643 | | | | |
| Seed, private, fall | | | 32,868 | 1,644 | | | | |
| Total | 10,800 | 3,015 | 124,536 | 12,107 | 336,000 | 50,400 | 1,012,000 | 151,800 |

| Item | James City | | Mathews | | Nansemond | | Norfolk | |
|---|---|---|---|---|---|---|---|---|
| OPERATING UNITS | | | | | | | | |
| Fishermen: | *Number* | | *Number* | | *Number* | | *Number* | |
| On vessels | | | | | 3 | | | |
| On boats and shore: | | | | | | | | |
| Regular | 6 | | 47 | | | | 30 | |
| Casual | | | | | | | 16 | |
| Total | 6 | | 47 | | 3 | | 46 | |
| Vessels: | | | | | | | | |
| Motor | | | | | 1 | | | |
| Net tonnage | | | | | 6 | | | |
| Boats: | | | | | | | | |
| Motor | 2 | | 24 | | | | 10 | |
| Other | | | | | | | 6 | |
| Apparatus, tongs | 6 | | 47 | | 2 | | 46 | |
| CATCH | | | | | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public spring | 5,550 | $834 | 59,533 | $8,930 | 1,250 | $188 | 15,000 | $2,250 |
| Seed, public, fall | 2,775 | 416 | 29,767 | 4,467 | 1,250 | 187 | 15,000 | 2,250 |
| Total | 8,325 | 1,250 | 89,300 | 13,397 | 2,500 | 375 | 30,000 | 4,500 |

| Item | Surry | | Warwick | | York | |
|---|---|---|---|---|---|---|
| OPERATING UNITS | | | | | | |
| Fishermen: | *Number* | | *Number* | | *Number* | |
| On vessels | 2 | | | | | |
| On boats and shore: | | | | | | |
| Regular | | | 131 | | 240 | |
| Casual | 4 | | 100 | | | |
| Total | 6 | | 231 | | 240 | |
| Vessels: | | | | | | |
| Motor | 1 | | | | | |
| Net tonnage | 10 | | | | | |
| Boats, motor | 2 | | 115 | | 122 | |
| Apparatus, tongs | 6 | | 231 | | 240 | |
| CATCH | | | | | | |
| Oysters: | *Bushels* | *Value* | *Bushels* | *Value* | *Bushels* | *Value* |
| Seed, public, spring | 6,000 | $900 | 84,500 | $12,675 | 222,000 | $33,300 |
| Seed, public, fall | 4,000 | 600 | 42,200 | 6,330 | 111,000 | 16,650 |
| Total | 10,000 | 1,500 | 126,700 | 19,005 | 333,000 | 49,950 |

NOTE.—Of the total number of persons fishing for seed oysters, 1,005 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 6 vessels, 461 motorboats, 36 other boats, 8 dredges, and 987 tongs.

## SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The catch of shad in the Potomac River in 1934 amounted to 152,876 in number, 567,100 pounds in weight, and their total value to the fishermen was $47,504. The catch of alewives for the same season amounted to 5,070,840 in number, with a total weight of 2,028,400 pounds, and a value to the fishermen of $16,256. These figures show a decrease of 69 percent in the weight and 68 percent in the value of shad as compared with 1933, and a decrease of 71 percent in weight and 32 percent in the value of alewives.

Approximately 64 percent of the shad, in weight, were taken with pound nets, and 36 percent, with gill nets. More than 99½ percent of the alewives were taken with pound nets, only a small quantity being taken with gill nets.

Statistics of the catch of shad and alewives in Potomac River are also included in the catch data for Maryland and Virginia which are published elsewhere in this report.

*Shad and alewife fisheries of the Potomac River, 1934*

| Item | Maryland | | | Virginia | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Number* | *Pounds* | *Value* | *Number* | *Pounds* | *Value* | *Number* | *Pounds* | *Value* |
| Fishermen on boats and shore: | | | | | | | | | |
| Regular | 34 | | | 296 | | | 330 | | |
| Casual | 113 | | | 121 | | | 234 | | |
| Total | 147 | | | 417 | | | 564 | | |
| Boats: | | | | | | | | | |
| Motor | 46 | | | 145 | | | 191 | | |
| Other | 45 | | | 93 | | | 138 | | |
| Apparatus: | | | | | | | | | |
| Pound nets | 46 | | | 279 | | | 325 | | |
| Gill nets | 1,045 | | | 774 | | | 1,819 | | |
| Square yards | 196,615 | | | 182,030 | | | 378,645 | | |
| Shad caught: | | | | | | | | | |
| With pound nets | 3,065 | 10,400 | $1,058 | 94,034 | 352,000 | $31,331 | 97,099 | 362,400 | $32,389 |
| With gill nets | 6,975 | 25,300 | 2,570 | 48,802 | 179,400 | 12,545 | 55,777 | 204,700 | 15,115 |
| Total | 10,040 | 35,700 | 3,628 | 142,836 | 531,400 | 43,876 | 152,876 | 567,100 | 47,504 |
| Alewives caught: | | | | | | | | | |
| With pound nets | 52,000 | 20,800 | 470 | 4,995,400 | 1,998,200 | 15,734 | 5,047,400 | 2,019,000 | 16,204 |
| With gill nets | | | | 23,440 | 9,400 | 52 | 23,440 | 9,400 | 52 |
| Total | 52,000 | 20,800 | 470 | 5,018,840 | 2,007,600 | 15,786 | 5,070,840 | 2,028,400 | 16,256 |

## TRADE IN FISHERY PRODUCTS IN WASHINGTON, D. C.[9]

The municipal fish wharf and market in Washington, D. C., is located in the southwestern part of the city on an arm of the Potomac River. At the present time 17 firms have stalls in this market, 4 have stalls in the new Center Market, located at Fifth and K Streets NW., and 4 are scattered in other parts of the city. Altogether there are 25 firms which employ 132 persons who received $137,185 in salaries and wages during 1934. Of the total employees 100 were regularly employed. These firms conduct mainly a wholesale business although some retail trade is carried on.

The facilities for handling fish and oysters from boats and vessels that may land at the wharf are good, but only a comparatively small

[9] Trade of fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department, District of Columbia.

quantity are brought into the city by this method. In the fall and winter, considerable quantities of shell oysters are landed, but most of the oysters handled in Washington are brought in already shucked from Maryland and Virginia, by trucks and other transportation facilities.

During the year 1934 the receipts of fresh and frozen fishery products as received at the municipal fish wharf amounted to 9,933,552 pounds. This is an increase of 4 percent as compared with 1933 and an increase of 1 percent as compared with the 5-year average.

During 1934 three firms in Washington, D. C., smoked fishery products, amounting to 187,100 pounds, valued at $20,205. Of this amount, 153,500 pounds, valued at $11,160, consisted of herring smoked as bloaters; 29,500 pounds, valued at $8,310, were whitefish; while the remainder or 4,100 pounds, valued at $735, consisted of alewives or "river herring", eels, and haddock.

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*Fishery products received at municipal fish wharf and market, Washington, D. C., 1934*

| Species | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Alewives (river herring) | 8,000 | 6,300 | 56,050 | 239,500 | 209,950 | 10,200 | | | | | | | 530,000 |
| Bluefish | 4,600 | 1,000 | 3,600 | 14,200 | 32,500 | 8,300 | 6,800 | 13,400 | 46,400 | 77,600 | 24,700 | 4,200 | 237,300 |
| Butterfish | 3,800 | 16,000 | 2,900 | 7,200 | 37,400 | 74,300 | 69,900 | 58,400 | 26,200 | 18,000 | 22,000 | 6,900 | 343,000 |
| Carp | 5,700 | 2,300 | 8,500 | 23,600 | 11,900 | 5,600 | 1,200 | 6,500 | 14,700 | 11,000 | 6,400 | 7,600 | 110,000 |
| Catfish | 2,000 | 200 | 12,300 | 36,900 | 10,400 | 10,400 | 1,400 | 2,900 | 7,580 | 12,300 | 16,100 | 5,000 | 117,480 |
| Cod | 1,000 | 800 | 1,200 | 3,200 | 3,000 | 1,000 | 200 | 500 | 200 | 100 | 900 | 1,700 | 13,800 |
| Croaker | 117,300 | 52,200 | 44,500 | 238,800 | 436,000 | 283,900 | 201,600 | 337,200 | 152,400 | 182,800 | 171,100 | 227,600 | 2,445,400 |
| Drum, red or redfish | 1,100 | 4,400 | 1,900 | 700 | 3,100 | 1,700 | | | 1,600 | 2,000 | 4,200 | 9,500 | 30,200 |
| Eels | 300 | 100 | 100 | 1,500 | 200 | | | 100 | 1,100 | 2,700 | 850 | 200 | 7,150 |
| Flounders | 36,000 | 35,700 | 30,800 | 23,100 | 34,500 | 15,900 | 22,400 | 19,965 | 13,170 | 26,110 | 33,755 | 2,300 | 314,700 |
| Gizzard shad | 14,300 | 2,400 | 38,600 | 10,400 | 800 | | | | | | 7,150 | 2,200 | 75,850 |
| Haddock | 27,405 | 22,185 | 55,170 | 42,680 | 36,825 | 16,125 | 17,520 | 22,650 | 19,000 | 22,110 | 18,640 | 25,460 | 325,770 |
| Hake | 600 | | | 800 | | | | | | | | | 1,400 |
| Halibut | 5,200 | 3,300 | 10,400 | 12,200 | 5,000 | 4,000 | 3,600 | 5,000 | 5,000 | 6,000 | 7,603 | 2,200 | 69,503 |
| Hickory shad or "jacks" | 2,300 | 900 | 1,500 | 1,100 | | | | | | | | | 5,800 |
| Hogfish | | | | | | | | | 200 | | | | 200 |
| Kingfish or "king mackerel" | 300 | | 1,000 | 2,400 | 2,200 | | | | 600 | 500 | 1,200 | 600 | 8,800 |
| Mackerel | 26,100 | 13,900 | 25,100 | 17,600 | 21,600 | 16,600 | 15,200 | 14,600 | 19,400 | 13,200 | 10,200 | 19,100 | 212,600 |
| Mullet | 2,600 | 400 | 1,200 | | | | | | 1,800 | 12,600 | 7,200 | 13,200 | 39,000 |
| Perch | 6,900 | 1,900 | 29,800 | 43,300 | 8,800 | 5,200 | 400 | 700 | 4,600 | 7,800 | 10,500 | 6,600 | 126,500 |
| Pike or pickerel | 100 | | 1,300 | 400 | | 100 | 400 | | 300 | 800 | 400 | 200 | 4,000 |
| Pollock | 400 | 200 | 3,000 | | 100 | | | | | | 300 | | 4,000 |
| Pompano | | | | | 100 | | | | | | 100 | | 200 |
| Salmon | 4,400 | 2,900 | 9,501 | 5,200 | 1,000 | 1,600 | 3,600 | 7,600 | 7,200 | 11,500 | 8,300 | 2,400 | 65,201 |
| Scup or porgy | 13,400 | 28,600 | 43,700 | 25,400 | 600 | 5,700 | 3,300 | 1,800 | | | | 700 | 123,200 |
| Sea bass | 63,000 | 50,700 | 82,500 | 68,600 | 16,800 | 12,600 | 35,300 | 15,600 | 1,800 | 800 | 11,800 | 2,900 | 362,400 |
| Shad | 16,100 | 12,200 | 64,100 | 137,500 | 119,250 | 5,400 | | | | | | | 354,550 |
| Sheepshead | | | | | | | | | | 300 | | | 300 |
| Skates | | | | 400 | | | | | | | | | 400 |
| Smelt | 810 | 1,245 | 1,520 | 1,645 | | | | | | 1,125 | | 1,000 | 7,345 |
| Snapper, red | 300 | 400 | 200 | 830 | 1,075 | 40 | | | 50 | 200 | 200 | 1,100 | 4,395 |
| Spot | | 2,200 | 3,200 | | 1,800 | 9,800 | 11,100 | 22,800 | 68,200 | 136,200 | 40,100 | 300 | 295,700 |
| Squeteagues or "sea trout" | 87,200 | 62,100 | 62,800 | 45,000 | 193,500 | 189,200 | 193,100 | 257,200 | 246,200 | 266,500 | 206,300 | 113,300 | 1,922,400 |
| Striped bass | 2,400 | 4,800 | 12,300 | 38,700 | 15,300 | 10,900 | 2,400 | 1,700 | 8,040 | 17,050 | 14,600 | 5,700 | 133,890 |
| Sturgeon | 50 | 230 | | | 690 | 83 | | | | 150 | | 653 | 1,856 |
| Swordfish | 275 | 225 | 1,306 | 810 | 468 | 150 | 643 | 590 | 550 | 575 | 600 | 100 | 6,292 |
| Tilefish | 600 | 100 | 300 | 400 | 300 | | 100 | | 50 | | 200 | 100 | 2,150 |
| Tuna | | | | | | 1,700 | 800 | | | | | | 2,500 |
| Whitefish | | | 200 | | | 300 | 400 | | 750 | 200 | | | 1,850 |
| Whiting | | | 200 | | 2,000 | | | | | | 200 | 3,200 | 5,600 |
| Yellowtail | | | | | | 200 | | | | | | 400 | 600 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Crabs: | | | | | | | | | | | | | |
| Hard | ---------- | ---------- | ---------- | 400 | 3,300 | 25,700 | 58,500 | 105,900 | 44,100 | 14,600 | ---------- | ---------- | 252,500 |
| Soft | ---------- | ---------- | ---------- | 9,225 | 6,570 | 18,630 | 14,715 | 16,650 | 7,110 | 3,015 | 540 | ---------- | 76,455 |
| Meat | 3,485 | 2,700 | 2,710 | 2,580 | 18,265 | 15,445 | 28,065 | 41,350 | 22,200 | 8,680 | 3,490 | 3,000 | 151,970 |
| Sea crawfish or "spiny lobster": | | | | | | | | | | | | | |
| Alive | 25 | 100 | 300 | 150 | ---------- | 50 | 25 | ---------- | ---------- | 25 | 25 | 25 | 725 |
| Meat | 25 | 30 | 135 | 300 | 75 | 75 | 10 | ---------- | ---------- | 5 | 135 | 125 | 915 |
| Lobsters: | | | | | | | | | | | | | |
| Alive | 578 | 275 | 150 | 300 | 850 | 1,075 | 120 | 1,850 | 775 | 1,500 | 900 | 650 | 9,023 |
| Meat | 100 | 60 | 75 | 125 | 75 | 35 | 10 | 400 | ---------- | ---------- | ---------- | 25 | 905 |
| Shrimp | 6,932 | 17,325 | 10,680 | 10,738 | 19,150 | 19,700 | 19,000 | 12,500 | 10,750 | 12,385 | 10,025 | 9,860 | 159,045 |
| Squid | 200 | 400 | 400 | ---------- | 200 | 300 | 200 | ---------- | ---------- | 400 | ---------- | 500 | 2,600 |
| Clams: | | | | | | | | | | | | | |
| Hard | 4,896 | 3,968 | 5,216 | 3,424 | 7,584 | 5,664 | 5,760 | 6,432 | 8,704 | 6,496 | 4,928 | 3,840 | [1] 66,912 |
| Soft | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | 18 | ---------- | ---------- | 18 |
| Oysters: | | | | | | | | | | | | | |
| Meats in the shell | 25,585 | 10,451 | 11,599 | 9,597 | 546 | ---------- | ---------- | ---------- | 24,500 | 68,733 | 66,241 | 31,311 | [2] 248,563 |
| Fresh shucked | 69,548 | 54,898 | 87,106 | 26,705 | 1,461 | ---------- | ---------- | ---------- | 62,038 | 141,601 | 97,230 | 80,605 | [3] 621,192 |
| Scallops | 1,712 | 1,008 | 1,680 | 2,704 | 5,072 | 2,400 | 3,520 | 792 | 800 | 3,680 | 1,560 | 1,176 | [4] 26,104 |
| Frogs | ---------- | ---------- | ---------- | 95 | 264 | 88 | 15 | 9 | ---------- | 19 | ---------- | 80 | 570 |
| Terrapin | 38 | ---------- | 100 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | 138 |
| Turtles: | | | | | | | | | | | | | |
| Sea | ---------- | ---------- | ---------- | ---------- | 990 | 1,125 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | 2,115 |
| Soft | ---------- | ---------- | ---------- | ---------- | 20 | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | 20 |
| Other | ---------- | ---------- | ---------- | ---------- | 40 | ---------- | ---------- | ---------- | ---------- | 460 | ---------- | ---------- | 500 |
| Total | 567,664 | 421,100 | 730,898 | 1,115,408 | 1,271,620 | 781,285 | 721,303 | 975,088 | 828,067 | 1,091,837 | 810,672 | 618,610 | 9,933,552 |

[1] 8,364 bushels. [2] 35,509 bushels. [3] 70,993 gallons. [4] 4,351 bushels.

NOTE.—The hard clams have been converted to pounds on the basis of 8 pounds of meats to the bushel, the oysters on the basis of 7 pounds of meats to the bushel, and 8¾ pounds to the gallon, and the scallops on the basis of 6 pounds of meats to the bushel.

## FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

(South Atlantic, Area XXIV; Gulf, Area XXV) [10]

The yield of the commercial fisheries of the marine areas of the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) during 1934 amounted to 447,913,900 pounds, valued at $9,993,660, to the fishermen, representing an increase of 49 percent in volume and 55 percent in value as compared with the catch in 1932, the most recent year for which catch statistics are available. These fisheries gave employment to 24,898 fishermen as compared with 21,560 in 1932.

There were 591 fishery wholesale and manufacturing establishments in these States in 1934, as compared with 585 in 1931, when the most recent previous survey of these establishments was made. In 1934, these establishments employed 14,354 persons, paid $2,873,812 in salaries and wages and produced manufactured products (canned, cured, packaged, and byproducts), valued at $9,906,595. In 1931, the wholesale and manufacturing firms employed 13,635 persons, paid $2,821,543 in salaries and wages and produced manufactured products valued at $8,374,588.

*Fisheries of the South Atlantic and Gulf States, 1934*

SUMMARY OF CATCH

| Product | North Carolina | | South Carolina | | Georgia | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Fish | 154,567,900 | $1,395,596 | 1,168,400 | $63,063 | 19,233,900 | $116,490 |
| Shellfish, etc | 8,894,000 | 276,629 | 4,722,800 | 162,228 | 7,907,000 | 243,020 |
| Total | 163,461,900 | 1,672,225 | 5,891,200 | 225,291 | 27,140,900 | 359,510 |

| Product | Florida | | Alabama | | Mississippi | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Fish | 97,899,100 | $2,117,934 | 2,755,200 | $110,046 | 1,312,400 | $42,155 |
| Shellfish, etc | 20,901,600 | 1,516,788 | 5,208,800 | 143,360 | 20,840,600 | 610,146 |
| Total | 118,800,700 | 3,634,722 | 7,964,000 | 253,406 | 22,153,000 | 652,301 |

| Product | Louisiana | | Texas | | Total | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Fish | 3,138,000 | $178,297 | 7,940,500 | $410,680 | 288,015,400 | $4,434,261 |
| Shellfish, etc | 73,495,200 | 2,106,266 | 17,928,500 | 500,962 | 159,898,500 | 5,559,399 |
| Total | 76,633,200 | 2,284,563 | 25,869,000 | 911,642 | 447,913,900 | 9,993,660 |

OPERATING UNITS: BY STATES

| Item | North Carolina | South Carolina | Georgia | Florida | Alabama | Mississippi | Louisiana | Texas | Total |
|---|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 723 | 20 | 139 | 870 | 122 | 557 | 369 | 114 | 2,914 |
| On boats and shore: | | | | | | | | | |
| Regular | 2,620 | 596 | 381 | 5,461 | 436 | 917 | 4,529 | 1,068 | 16,008 |
| Casual | 2,012 | 877 | 468 | 1,177 | 125 | 232 | 626 | 459 | 5,976 |
| Total | 5,355 | 1,493 | 988 | 7,508 | 683 | 1,706 | 5,524 | 1,641 | 24,898 |

[10] These are the numbers given to these areas by the North American Council on Fishery Investigations. The catch in the Mississippi River and tributaries is not included in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

*Fisheries of the South Atlantic and Gulf States, 1934*—Continued

OPERATING UNITS: By States—Continued

| Item | North Carolina | South Carolina | Georgia | Florida | Alabama | Mississippi | Louisiana | Texas | Total |
|---|---|---|---|---|---|---|---|---|---|
| Vessels: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Motor | 93 | 5 | 46 | 202 | 34 | 144 | 151 | 35 | 710 |
| Net tonnage | 1,340 | 67 | 421 | 3,316 | 339 | 1,905 | 1,056 | 345 | 8,789 |
| Sail | 30 | | | | | | | | 30 |
| Net tonnage | 298 | | | | | | | | 298 |
| Total vessels | 123 | 5 | 46 | 202 | 34 | 144 | 151 | 35 | 740 |
| Total net tonnage | 1,638 | 67 | 421 | 3,316 | 339 | 1,905 | 1,056 | 345 | 9,087 |
| Boats: | | | | | | | | | |
| Motor | 1,344 | 94 | 122 | 2,064 | 184 | 341 | 1 698 | 462 | 6,309 |
| Other | 1,829 | 762 | 423 | 2,966 | 160 | 361 | 1,243 | 345 | 8,089 |
| Accessory boats | 112 | | 6 | 18 | | | 62 | | 198 |
| Apparatus: | | | | | | | | | |
| Purse seines: | | | | | | | | | |
| Menhaden | 31 | | 2 | 5 | | | | | 38 |
| Length, yards | 7,940 | | 600 | 1,475 | | | | | 10,015 |
| Other | 1 | | | 1 | | | | | 2 |
| Length, yards | 175 | | | 350 | | | | | 525 |
| Haul seines: | | | | | | | | | |
| Common | 412 | 27 | 8 | 116 | 8 | 1 | 95 | 23 | 690 |
| Length, yards | 53,160 | 3,880 | 800 | 39,455 | 4,350 | 300 | 21,404 | 2,500 | 125,849 |
| Long | 87 | | | 75 | | | | | 162 |
| Length, yards | 86,475 | | | 50,300 | | | | | 136,775 |
| Gill nets: | | | | | | | | | |
| Anchor | 1,840 | 190 | 47 | 26 | | | | | 2,103 |
| Square yards | 1,128,700 | 129,296 | 11,375 | 38,600 | | | | | 1,307,971 |
| Drift | 220 | 285 | 165 | 105 | | | | | 775 |
| Square yards | 469,170 | 217,120 | 103,540 | 185,790 | | | | | 975,620 |
| Runaround | 159 | 16 | 12 | 2,259 | | | | 84 | 2,530 |
| Square yards | 66,730 | 4,050 | 3,570 | 1,820,749 | | | | 18,344 | 1,913,443 |
| Stake | 4,931 | | 5 | 6 | 16 | | | 215 | 5,173 |
| Square yards | 388,205 | | 1,800 | 2,340 | 2,450 | | | 53,662 | 448,457 |
| Trammel nets | | | | 181 | 57 | 27 | 75 | 85 | 425 |
| Square yards | | | | 129,839 | 18,745 | 7,370 | 13,599 | 40,240 | 209,793 |
| Lines: | | | | | | | | | |
| Hand | 81 | 175 | 39 | 1,549 | 126 | 159 | 242 | 356 | 2,727 |
| Hooks | 172 | 495 | 39 | 2,155 | 204 | 178 | 253 | 356 | 3,852 |
| Troll | 45 | | | 1,029 | | | | 17 | 1,091 |
| Hooks | 45 | | | 1,137 | | | | 17 | 1,199 |
| Trot with baits or snoods | 423 | 6 | 32 | 30 | 38 | 99 | 380 | 36 | 1,044 |
| Baits or snoods | 342,800 | 4,500 | 10,080 | 6,740 | 7,640 | 19,260 | 83,035 | 13,200 | 487,255 |
| Trot with hooks | 50 | | 40 | 106 | 112 | | 4 | 68 | 380 |
| Hooks | 6,200 | | 2,840 | 42,360 | 11,550 | | 1,800 | 52,150 | 116,900 |
| Pound nets | 1,522 | | | 17 | | | | | 1,539 |
| Weirs | 12 | | | | | | | | 12 |
| Wheels | 33 | | | | | | | | 33 |
| Stop nets | | | | 9 | | | | | 9 |
| Square yards | | | | 15,670 | | | | | 15,670 |
| Fyke nets | 480 | | | | 10 | | | | 490 |
| Dip nets: | | | | | | | | | |
| Common | 480 | | | 57 | | | 159 | 6 | 702 |
| Drop | | | | 24 | | 120 | 13,369 | | 13,513 |
| Cast nets | | | 10 | 18 | | 64 | 178 | 1 | 271 |
| Otter trawls: | | | | | | | | | |
| Fish | | | | 2 | | | | | 2 |
| Yards at mouth | | | | 63 | | | | | 63 |
| Shrimp | 130 | 50 | 149 | 264 | 160 | 366 | 1,611 | 319 | 3,049 |
| Yards at mouth | 2,634 | 1,009 | 3,248 | 5,324 | 2,067 | 4,658 | 19,354 | 5,066 | 43,360 |
| Brush traps | | | | | | | 25,250 | | 25,250 |
| Pots: | | | | | | | | | |
| Crab | | | 48 | 1,648 | | | | | 1,696 |
| Eel | 750 | | | 40 | | | | | 790 |
| Fish | 730 | | 50 | 3,020 | 78 | | | | 3,878 |
| Sea crawfish | | | | 958 | | | | | 958 |
| Spears | 65 | 20 | | 31 | 60 | 72 | | 105 | 353 |
| Dredges: | | | | | | | | | |
| Clam | | | | 1 | | | | | 1 |
| Oyster | 143 | | 3 | 4 | 9 | 398 | 57 | 48 | 662 |
| Yards at mouth | 147 | | 3 | 4 | 9 | 398 | 58 | 53 | 672 |
| Scallops | | | | 6 | | | | | 6 |
| Yards at mouth | | | | 11 | | | | | 11 |
| Tongs, oyster | 249 | 11 | 90 | 391 | 106 | 224 | 758 | 196 | 2,025 |
| Rakes, other than for oysters | 431 | 2 | | 2 | | | | | 435 |
| Forks | | | | 52 | | | | | 52 |
| Grabs | | 317 | 20 | 28 | | | | | 365 |
| Coquina scoops | | | | 1 | | | | | 1 |
| Hooks, sponge | | | | 241 | | | | | 241 |
| Diving outfits | | | | 53 | | | | | 53 |

*Fisheries of the South Atlantic and Gulf States, 1934*—Continued

CATCH: BY STATES

| Species | North Carolina | | South Carolina | | Georgia | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 14,897,000 | $98,901 | | | | |
| Black bass | 1,500 | 75 | | | | |
| Bluefish | 1,766,500 | 63,515 | 3,000 | $180 | | |
| Bowfin | 600 | 6 | | | | |
| Butterfish | 43,500 | 745 | | | | |
| Carp | 108,600 | 4,316 | | | | |
| Catfish and bullheads | 162,600 | 3,173 | | | 52,500 | $3,150 |
| Cero | 4,400 | 220 | | | | |
| Croaker | 7,682,800 | 91,058 | | | 7,000 | 280 |
| Drum, red or redfish | 132,500 | 2,750 | 3,500 | 105 | 2,500 | 125 |
| Eels | 44,300 | 2,043 | | | | |
| Flounders | 987,500 | 42,150 | 31,500 | 1,775 | 3,300 | 96 |
| Gizzard shad | 24,000 | 230 | | | | |
| Grunts | | | 9,100 | 273 | | |
| Harvestfish or "starfish" | 820,000 | 12,325 | | | | |
| Hickory shad | 99,700 | 4,634 | 4,500 | 450 | 10,500 | 1,042 |
| King whiting or "kingfish" | 302,000 | 7,240 | 14,000 | 420 | 12,000 | 380 |
| Menhaden | 106,651,100 | 355,503 | | | 18,751,500 | 63,859 |
| Mullet | 3,889,300 | 105,289 | 700,000 | 19,000 | 59,000 | 2,600 |
| Pigfish | 92,000 | 1,130 | | | | |
| Pike or pickerel | 1,200 | 66 | | | | |
| Pinfish or sailors choice | 180,000 | 900 | | | | |
| Pompano | 400 | 60 | | | | |
| Sea bass | 75,400 | 3,045 | 106,200 | 4,560 | 23,000 | 690 |
| Shad | 1,274,000 | 193,187 | 208,600 | 31,290 | 232,000 | 38,400 |
| Sharks | | | 12,000 | 120 | | |
| Sheepshead | 3,700 | 80 | | | | |
| Spadefish | 6,000 | 150 | | | | |
| Spanish mackerel | 47,700 | 2,358 | | | | |
| Spot | 4,788,000 | 73,035 | 10,500 | 315 | 13,000 | 460 |
| Squeteagues or "sea trout": | | | | | | |
| Gray | 7,729,400 | 180,588 | 2,000 | 130 | | |
| Spotted | 1,849,100 | 96,165 | 13,500 | 945 | 56,000 | 4,480 |
| Striped bass | 362,000 | 35,675 | | | | |
| Sturgeon | 1,600 | 160 | 50,000 | 3,500 | 11,600 | 928 |
| Sunfish | 100 | 1 | | | | |
| White perch | 522,200 | 22,343 | | | | |
| Yellow perch | 17,200 | 480 | | | | |
| Total | 154,567,900 | 1,395,596 | 1,168,400 | 63,063 | 19,233,900 | 116,490 |
| SHELLFISH, ETC. | | | | | | |
| Crabs: | | | | | | |
| Hard [1] | 4,543,600 | 67,238 | 8,000 | 160 | 483,500 | 7,252 |
| Soft | 251,400 | 36,210 | | | | |
| Shrimp | 2,563,900 | 80,367 | 1,801,400 | 54,042 | 6,842,900 | 203,127 |
| Clams, hard, public [2] | 338,000 | 33,647 | 47,000 | 5,862 | | |
| Octopus | | | 1,500 | 90 | | |
| Oysters:[3] | | | | | | |
| Market, public, spring | 436,700 | 18,117 | 1,329,100 | 41,347 | | |
| Market, public, fall | 699,300 | 33,125 | 471,500 | 17,684 | | |
| Market, private, spring | 21,700 | 1,550 | 614,600 | 22,169 | 327,600 | 16,588 |
| Market, private, fall | 3,000 | 300 | 446,700 | 20,574 | 241,100 | 14,773 |
| Scallops, bay | 36,000 | 6,000 | | | | |
| Terrapin, diamond back | 400 | 75 | 3,000 | 300 | 11,900 | 1,280 |
| Total | 8,894,000 | 276,629 | 4,722,800 | 162,228 | 7,907,000 | 243,020 |
| Grand total | 163,461,900 | 1,672,225 | 5,891,200 | 225,291 | 27,140,900 | 359,510 |

| Species | Florida | | Alabama | | Mississippi | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 214,900 | $1,055 | | | | |
| Amberjack | 4,000 | 80 | | | | |
| Black bass | 422,900 | 25,195 | | | | |
| Bluefish | 1,933,900 | 100,675 | 28,600 | $754 | | |
| Blue runner or hardtail | 181,100 | 3,074 | 2,900 | 58 | | |
| Buffalofish | | | 18,600 | 744 | | |
| Cabio or crab eater | 7,400 | 181 | | | | |
| Catfish and bullheads | 2,854,200 | 93,477 | 120,600 | 7,636 | 30,300 | $606 |
| Cigarfish | 4,500 | 90 | | | | |
| Crappie | 462,300 | 11,956 | | | | |
| Crevalle | 111,000 | 1,565 | 2,600 | 58 | | |
| Croaker | 52,400 | 1,194 | 21,200 | 386 | 13,600 | 339 |
| Dolphin | 8,000 | 240 | | | | |
| Drum: | | | | | | |
| Black | 100,100 | 2,165 | 700 | 20 | 3,800 | 59 |
| Red or redfish | 1,016,900 | 24,277 | 64,700 | 2,442 | 73,000 | 2,888 |
| Eels | 18,400 | 553 | | | | |

See footnotes at end of table.

*Fisheries of the South Atlantic and Gulf States, 1934*—Continued

CATCH: BY STATES—Continued

| Species | Florida | | Alabama | | Mississippi | |
|---|---|---|---|---|---|---|
| FISH—continued | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders | 74,800 | $3,142 | 35,900 | $2,718 | 42,000 | $2,410 |
| Groupers | 3,341,400 | 79,490 | 151,200 | 3,356 | 55,000 | 1,250 |
| Grunts | 40,300 | 1,138 | | | | |
| Hickory shad | 42,900 | 352 | | | | |
| Hogfish | 6,000 | 180 | | | | |
| Jewfish | 13,400 | 408 | | | | |
| Kingfish or "king mackerel" | 2,638,100 | 116,097 | | | | |
| King whiting or "kingfish" | 324,600 | 7,844 | 4,800 | 90 | 3,600 | 89 |
| Mackerel | 200 | 9 | | | | |
| Menhaden | 38,983,400 | 121,643 | | | | |
| Mojarro | 19,100 | 391 | | | | |
| Mullet | 23,966,300 | 641,127 | 1,168,200 | 28,387 | 644,500 | 14,222 |
| Muttonfish | 198,900 | 8,839 | | | | |
| Paddlefish or spoonbill cat | | | 600 | 36 | | |
| Permit | 1,700 | 34 | | | | |
| Pigfish | 94,800 | 1,823 | | | | |
| Pinfish or sailors choice | 31,000 | 620 | | | | |
| Pompano | 437,500 | 78,134 | 1,800 | 270 | | |
| Porgies | 38,500 | 934 | | | | |
| Sawfish | 17,500 | 35 | | | | |
| Sea bass | 52,000 | 2,022 | | | | |
| Sea catfish | 105,000 | 210 | | | | |
| Shad | 782,200 | 66,986 | | | | |
| Sharks | 3,217,500 | 8,535 | | | | |
| Sheepshead | 605,900 | 13,266 | 8,000 | 305 | 23,000 | 920 |
| Skates | 175,000 | 350 | | | | |
| Snapper: | | | | | | |
| Mangrove | 228,700 | 7,017 | | | | |
| Red | 4,067,800 | 224,271 | 950,500 | 51,859 | 123,200 | 6,720 |
| Snook or sergeantfish | 421,800 | 9,946 | | | | |
| Spanish mackerel | 6,734,200 | 271,787 | 11,900 | 533 | | |
| Spot | 85,100 | 1,687 | 7,700 | 141 | | |
| Squeteagues or "sea trout": | | | | | | |
| Gray | 10,000 | 500 | | | | |
| Spotted | 3,083,200 | 163,275 | 137,500 | 9,153 | 146,900 | 8,814 |
| White | 14,300 | 296 | 7,600 | 176 | 153,500 | 3,838 |
| Sturgeon | 1,000 | 60 | 8,400 | 912 | | |
| Sunfish | 517,500 | 13,544 | | | | |
| Tenpounder | 27,500 | 482 | 1,200 | 12 | | |
| Tripletail | 600 | 12 | | | | |
| Tuna or "horse mackerel" | 4,300 | 161 | | | | |
| Turbot | 1,500 | 45 | | | | |
| Wahoo | 2,000 | 60 | | | | |
| White perch | 18,200 | 728 | | | | |
| Yellowtail | 81,400 | 4,677 | | | | |
| Total | 97,899,100 | 2,117,934 | 2,755,200 | 110,046 | 1,312,400 | 42,155 |
| SHELLFISH, ETC. | | | | | | |
| Crabs: | | | | | | |
| Hard [1] | 182,800 | 3,474 | 257,400 | 3,677 | 602,700 | 7,114 |
| King | 500,000 | 600 | | | | |
| Soft | | | 1,600 | 312 | 4,200 | 720 |
| Stone | 80,600 | 5,737 | | | | |
| Sea crawfish or "spiny lobster" | 351,300 | 17,166 | | | | |
| Shrimp | 16,292,200 | 497,870 | 4,556,600 | 115,176 | 15,329,800 | 292,522 |
| Clams: | | | | | | |
| Coquina | 5,800 | 975 | | | | |
| Hard, public [2] | 535,000 | 26,082 | | | | |
| Conchs | 2,500 | 75 | | | | |
| Oysters: [3] | | | | | | |
| Market, public, spring | 827,400 | 40,572 | 195,500 | 11,509 | 3,749,800 | 244,374 |
| Market, public, fall | 509,700 | 30,573 | 164,600 | 9,685 | 1,154,100 | 65,416 |
| Market, private, spring | 361,800 | 16,656 | 5,400 | 450 | | |
| Market, private, fall | 337,100 | 13,830 | 26,300 | 2,190 | | |
| Scallops: | | | | | | |
| Bay | 74,100 | 6,596 | | | | |
| Sea | 120,200 | 17,891 | | | | |
| Terrapin, diamond back | | | 1,400 | 361 | | |
| Turtles: | | | | | | |
| Green | 4,600 | 244 | | | | |
| Soft shell | 61,200 | 797 | | | | |
| Sponges: | | | | | | |
| Grass | 45,400 | 24,699 | | | | |
| Sheepswool | 458,500 | 720,257 | | | | |
| Velvet | 200 | 110 | | | | |
| Wire | 14,400 | 7,894 | | | | |
| Yellow | 136,800 | 84,690 | | | | |
| Total | 20,901,600 | 1,516,788 | 5,208,800 | 143,360 | 20,840,600 | 610,146 |
| Grand total | 118,800,700 | 3,634,722 | 7,964,000 | 253,406 | 22,153,000 | 652,301 |

See footnotes at end of table.

*Fisheries of the South Atlantic and Gulf States, 1934*—Continued

CATCH: BY STATES—Continued

| Species | Louisiana | | Texas | | Total | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | | | 15,111,900 | $91,956 |
| Amberjack | | | | | 4,000 | 80 |
| Black bass | | | | | 424,400 | 25,270 |
| Bluefish | | | | | 3,732,000 | 165,124 |
| Blue runner or hardtail | | | | | 184,000 | 3,132 |
| Bowfin | | | | | 600 | 6 |
| Buffalofish | | | | | 18,600 | 744 |
| Butterfish | | | | | 43,500 | 745 |
| Cabio or crab eater | | | | | 7,400 | 181 |
| Carp | | | | | 108,600 | 4,316 |
| Catfish and bullheads | 197,000 | $6,870 | 63,100 | $1,712 | 3,480,300 | 116,624 |
| Cero | | | | | 4,400 | 220 |
| Cigarfish | | | | | 4,500 | 90 |
| Crappie | | | | | 462,300 | 11,956 |
| Crevalle | 1,100 | 35 | | | 114,700 | 1,658 |
| Croaker | 300,900 | 15,177 | 296,100 | 9,333 | 8,374,000 | 117,767 |
| Dolphin | | | | | 8,000 | 240 |
| Drum: | | | | | | |
| Black | 198,500 | 7,128 | 2,252,700 | 59,648 | 2,555,800 | 69,020 |
| Red or redfish | 492,500 | 28,200 | 1,579,100 | 95,433 | 3,364,700 | 156,220 |
| Eels | | | | | 62,700 | 2,596 |
| Flounders | 24,300 | 1,895 | 97,700 | 8,469 | 1,297,000 | 62,655 |
| Garfish | 500 | 2 | | | 500 | 2 |
| Gizzard shad | | | | | 24,000 | 230 |
| Groupers | 18,400 | 770 | 3,700 | 80 | 3,569,700 | 84,946 |
| Grunts | | | | | 49,400 | 1,411 |
| Harvestfish or "starfish" | | | | | 820,000 | 12,325 |
| Hickory shad | | | | | 157,600 | 6,478 |
| Hogfish | | | | | 6,000 | 180 |
| Jewfish | 5,000 | 140 | 28,300 | 695 | 46,700 | 1,243 |
| Kingfish or "king mackerel" | 13,400 | 445 | 9,600 | 384 | 2,661,100 | 116,926 |
| King whiting or "kingfish" | | | | | 661,000 | 16,063 |
| Mackerel | | | | | 200 | 9 |
| Menhaden | | | | | 164,386,000 | 541,005 |
| Mojarro | | | | | 19,100 | 391 |
| Mullet | 18,000 | 278 | 39,600 | 792 | 30,484,900 | 811,695 |
| Muttonfish | | | | | 198,900 | 8,839 |
| Paddlefish or spoonbill cat | | | | | 600 | 36 |
| Permit | | | | | 1,700 | 34 |
| Pigfish | | | | | 186,800 | 2,953 |
| Pike or pickerel | | | | | 1,200 | 66 |
| Pinfish or sailors choice | | | | | 211,000 | 1,520 |
| Pompano | | | 2,400 | 327 | 442,100 | 78,791 |
| Porgies | | | | | 38,500 | 934 |
| Sawfish | | | | | 17,500 | 35 |
| Sea bass | | | | | 256,600 | 10,317 |
| Sea catfish | | | | | 105,000 | 210 |
| Shad | | | | | 2,496,800 | 329,863 |
| Sharks | | | | | 3,229,500 | 8,655 |
| Sheepshead | 267,500 | 14,556 | 290,800 | 9,785 | 1,198,900 | 38,912 |
| Skates | | | | | 175,000 | 350 |
| Snapper: | | | | | | |
| Mangrove | | | | | 228,700 | 7,017 |
| Red | 79,000 | 4,550 | 635,400 | 36,092 | 5,855,900 | 323,492 |
| Snook or sergeantfish | | | 6,500 | 565 | 428,300 | 10,511 |
| Spadefish | | | | | 6,000 | 150 |
| Spanish mackerel | 1,900 | 96 | 173,600 | 11,001 | 6,969,300 | 285,775 |
| Spot | 1,900 | 67 | | | 4,906,200 | 75,705 |
| Squeteagues or "sea trout": | | | | | | |
| Gray | | | | | 7,741,400 | 181,218 |
| Spotted | 1,073,000 | 87,046 | 2,351,700 | 173,413 | 8,710,900 | 543,291 |
| White | 444,900 | 11,038 | 110,200 | 2,951 | 730,500 | 18,299 |
| Striped bass | | | | | 362,000 | 35,675 |
| Sturgeon | | | | | 72,600 | 5,560 |
| Sunfish | | | | | 517,600 | 13,545 |
| Tenpounder | | | | | 28,700 | 494 |
| Tripletail | 200 | 4 | | | 800 | 16 |
| Tuna or "horse mackerel" | | | | | 4,300 | 161 |
| Turbot | | | | | 1,500 | 45 |
| Wahoo | | | | | 2,000 | 60 |
| White perch | | | | | 540,400 | 23,071 |
| Yellow perch | | | | | 17,200 | 480 |
| Yellowtail | | | | | 81,400 | 4,677 |
| Total | 3,138,000 | 178,297 | 7,940,500 | 410,680 | 288,015,400 | 4,434,261 |

See footnotes at end of table.

*Fisheries of the South Atlantic and Gulf States, 1934*—Continued

CATCH: BY STATES—Continued

| Species | Louisiana | | Texas | | Total | |
|---|---|---|---|---|---|---|
| SHELLFISH, ETC. | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs: | | | | | | |
| Hard [1] | 11,676,500 | $163,942 | 258,100 | $12,704 | 18,012,600 | $265,561 |
| King | | | | | 500,000 | 600 |
| Soft | 651,200 | 85,569 | | | 908,400 | 122,811 |
| Stone | | | | | 80,600 | 5,737 |
| Sea crawfish or "spiny lobster" | | | | | 351,300 | 17,166 |
| Shrimp | 55,572,300 | 1,442,370 | 16,358,600 | 383,054 | 119,317,700 | 3,068,528 |
| Clams: | | | | | | |
| Coquina | | | | | 5,800 | 975 |
| Hard, public [2] | | | | | 920,000 | 65,591 |
| Conchs | | | | | 2,500 | 75 |
| Octopus | | | | | 1,500 | 90 |
| Oysters: [3] | | | | | | |
| Market, public, spring | 1,043,700 | 79,316 | 689,700 | 54,084 | 8,271,900 | 489,319 |
| Market, public, fall | 276,400 | 34,205 | 622,100 | 51,126 | 3,897,700 | 241,808 |
| Market, private, spring | 1,972,700 | 132,580 | | | 3,303,800 | 189,993 |
| Market, private, fall | 2,298,900 | 168,214 | | | 3,353,100 | 219,881 |
| Scallops: | | | | | | |
| Bay | | | | | 110,100 | 12,596 |
| Sea | | | | | 120,200 | 17,891 |
| Terrapin, diamond back | | | | | 16,700 | 2,016 |
| Turtles: | | | | | | |
| Green | | | | | 4,600 | 244 |
| Loggerhead | 3,500 | 70 | | | 3,500 | 70 |
| Soft shell | | | | | 61,200 | 797 |
| Sponges: | | | | | | |
| Grass | | | | | 45,400 | 24,699 |
| Sheepswool | | | | | 458,500 | 720,257 |
| Velvet | | | | | 200 | 110 |
| Wire | | | | | 14,400 | 7,894 |
| Yellow | | | | | 136,800 | 84,690 |
| Total | 73,495,200 | 2,106,266 | 17,928,500 | 500,962 | 159,898,500 | 5,559,399 |
| Grand total | 76,633,200 | 2,284,563 | 25,869,000 | 911,642 | 447,913,900 | 9,993,660 |

[1] Statistics on hard crabs used in this table are based on yields of 4 pounds per dozen in North Carolina and South Carolina; 6 pounds in Georgia; 6.28 pounds in Florida; 7 pounds in Alabama; 6.09 pounds in Mississippi; 5.43 pounds in Louisiana; and 5.5 pounds in Texas.

[2] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States.

[3] Statistics on market oysters used in this table are based on yields of 5.58 pounds of meats per bushel in North Carolina; 4.74 in South Carolina; 5.88 in Georgia; 3.57 in Florida; 3.29 in Alabama; 2.22 in Mississippi; 4.32 in Louisiana; and 4.41 in Texas.

NOTE.—The catch for Mississippi includes the following products taken by Mississippi craft in Louisiana waters: Shrimp, 8,734,100 pounds, valued at $166,360; oysters, market, spring, 3,667,700 pounds of meats, valued at $237,876, and oysters, market, fall, 938,100 pounds, valued at $49,790. Of the total catch for Florida all of the mackerel and sea scallops were taken off the coast of New York. In addition 114,600 pounds of bluefish, valued at $8,938, and 1,300 pounds of tuna or "borse mackerel" valued at $41, were taken in the same waters. The seed oyster fishery was prosecuted in this section only in North Carolina where 12 regular fishermen using 6 sail boats and 12 dredges took 17,450 bushels of seed oysters, valued at $2,617 from public beds. All of these fishermen, craft, and gear were duplicated among those in the fisheries for market oysters or other species.

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

| Product | North Carolina | | South Carolina | | Georgia | |
|---|---|---|---|---|---|---|
| Crabs: | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Hard ... number | 13,630,800 | $67,238 | 24,000 | $160 | 967,000 | $7,252 |
| Soft ... do | 1,005,600 | 36,210 | | | | |
| Clams, hard, public ... bushels | 42,250 | 33,647 | 5,875 | 5,862 | | |
| Oysters: | | | | | | |
| Market, public, spring ... do | 78,262 | 18,117 | 280,401 | 41,347 | | |
| Market, public, fall ... do | 125,323 | 33,125 | 99,473 | 17,684 | | |
| Market, private, spring ... do | 3,889 | 1,550 | 129,662 | 22,169 | 55,714 | 16,588 |
| Market, private, fall ... do | 538 | 300 | 94,241 | 20,574 | 41,003 | 14,773 |
| Scallops: | | | | | | |
| Bay ... do | 6,000 | 6,000 | | | | |
| Sea ... do | | | | | | |

*Fisheries of the South Atlantic and Gulf States, 1934*—Continued

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS—Continued

| Product | Florida | | Alabama | | Mississippi | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Crabs: | | | | | | |
| Hard ..... number | 349,148 | $3,474 | 440,154 | $3,677 | 1,187,319 | $7,114 |
| Soft ..... do | | | 4,800 | 312 | 12,600 | 720 |
| Clams, hard, public ..... bushels | 66,875 | 26,082 | | | | |
| Oysters: | | | | | | |
| Market, public, spring ..... do | 231,765 | 40,572 | 59,422 | 11,599 | 1,689,099 | 244,374 |
| Market, public, fall ..... do | 142,773 | 30,573 | 50,030 | 9,685 | 519,865 | 65,416 |
| Market, private, spring ..... do | 101,345 | 16,656 | 1,641 | 450 | | |
| Market, private, fall ..... do | 94,426 | 13,830 | 7,994 | 2,190 | | |
| Scallops: | | | | | | |
| Bay ..... do | 13,981 | 6,596 | | | | |
| Sea ..... do | 20,333 | 17,891 | | | | |

| Product | Louisiana | | Texas | | Total | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Crabs: | | | | | | |
| Hard ..... number | 25,805,065 | $163,942 | 562,658 | $12,704 | 42,966,144 | $265,561 |
| Soft ..... do | 1,645,136 | 85,569 | | | 2,668,136 | 122,811 |
| Clams, hard, public ..... bushels | | | | | 115,000 | 65,591 |
| Oysters: | | | | | | |
| Market, public, spring ..... do | 241,597 | 79,316 | 156,395 | 54,084 | 2,736,941 | 489,319 |
| Market, public, fall ..... do | 63,981 | 34,205 | 141,066 | 51,120 | 1,142,511 | 241,808 |
| Market, private, spring ..... do | 456,644 | 132,580 | | | 748,895 | 189,993 |
| Market, private, fall ..... do | 532,153 | 168,214 | | | 770,355 | 219,881 |
| Scallops: | | | | | | |
| Bay ..... do | | | | | 19,981 | 12,596 |
| Sea ..... do | | | | | 20,333 | 17,891 |

NOTE.—The Mississippi production includes the following products taken in Louisiana waters by Mississippi craft: Oysters, market, spring, 1,669,910 bushels, valued at $237,876, and oysters, market, fall, 461,487 bushels, valued at $49,790.

*Industries related to the fisheries of the South Atlantic and Gulf States, 1934*

OPERATING UNITS, SALARIES, AND WAGES

| Item | North Carolina | South Carolina | Georgia | Florida | Alabama | Mississippi | Louisiana | Texas | Total |
|---|---|---|---|---|---|---|---|---|---|
| Transporting: | | | | | | | | | |
| Persons engaged: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 87 | 104 | 23 | 56 | 10 | | 117 | | 397 |
| On boats | 11 | 58 | 10 | 86 | | 10 | 6 | | 181 |
| Total | 98 | 162 | 33 | 142 | 10 | 10 | 123 | | 578 |
| Vessels: | | | | | | | | | |
| Motor | 48 | 10 | 7 | 31 | 5 | | 56 | | 157 |
| Net tonnage | 427 | 120 | 86 | 456 | 37 | | 505 | | 1,631 |
| Sail | | 33 | | | | | | | 33 |
| Net tonnage | | 301 | | | | | | | 301 |
| Total vessels | 48 | 43 | 7 | 31 | 5 | | 56 | | 190 |
| Total net tonnage | 427 | 421 | 86 | 456 | 37 | | 505 | | 1,932 |
| Boats | 9 | 58 | 5 | 88 | | 5 | 3 | | 168 |
| Wholesale and manufacturing: | | | | | | | | | |
| Establishments | 84 | 31 | 29 | 241 | 20 | 40 | 103 | 43 | 591 |
| Persons engaged: | | | | | | | | | |
| Proprietors | 104 | 40 | 37 | 253 | 15 | 37 | 109 | 42 | 637 |
| Salaried employees | 21 | 18 | 15 | 157 | 31 | 56 | 85 | 26 | 409 |
| Wage earners: | | | | | | | | | |
| Average for season | 1,269 | 564 | 945 | 1,796 | 357 | 2,382 | 4,452 | 1,543 | 13,308 |
| Average for year | 465 | 223 | 235 | 916 | 178 | 874 | 1,031 | 278 | 4,200 |
| Paid to salaried employees | $55,397 | $34,020 | $31,001 | $242,609 | $34,046 | $86,119 | $138,963 | $52,963 | $675,118 |
| Paid to wage earners | $219,778 | $112,743 | $127,355 | $544,963 | $67,951 | $302,140 | $634,720 | $189,044 | $2,198,694 |
| Total salaries and wages | $275,175 | $146,763 | $158,356 | $787,572 | $101,997 | $388,259 | $773,683 | $242,007 | $2,873,812 |
| Fishermen manufacturing | 267 | 8 | 14 | 402 | 122 | 61 | 50 | 63 | 987 |

See footnotes at end of table.

*Industries related to the fisheries of the South Atlantic and Gulf States, 1934*—Con.

PRODUCTS MANUFACTURED

| Item | North Carolina | | South Carolina | | Georgia | | Florida | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Valu* |
| By manufacturing establishments: | | | | | | | | |
| Alewife roe, canned standard cases | 5,665 | $16,609 | | | | | | |
| Groupers, fresh steaks pounds | | | | | | | 341,299 | $45,919 |
| Menhaden products: | | | | | | | | |
| Acid scrap tons | 4,768 | 85,800 | | | (1) | (1) | 4,140 | 70,218 |
| Dry scrap do | 3,207 | 107,552 | | | | | 6,523 | 211,066 |
| Fish meal do | (1) | (1) | | | | | 1,885 | 71,240 |
| Oil gallons | 407,000 | 72,960 | | | (1) | (1) | 555,250 | 100,468 |
| Mullet, salted pounds | 507,300 | 22,419 | | | | | 337,800 | 17,290 |
| Crab meat, packaged, fresh cooked pounds | 437,042 | 143,437 | | | 57,500 | $15,095 | 16,700 | 6,300 |
| Shrimp: | | | | | | | | |
| Cooked and peeled do | | | | | (1) | (1) | | |
| Canned standard cases | | | (1) | (1) | 101,411 | 498,637 | 48,567 | 234,888 |
| Crawfish meat, packaged, fresh cooked pounds | | | | | | | 56,500 | 21,738 |
| Clams, hard, canned chowder standard cases | | | | | | | 746 | 2,873 |
| Marine-shell products, novelties | | | | | | | | 7,900 |
| Oysters: | | | | | | | | |
| Fresh shucked gallons | 109,645 | 93,945 | 40,901 | $40,901 | 32,207 | 32,742 | 115,667 | 150,770 |
| Canned standard cases | | | 91,752 | 392,551 | (1) | (1) | 12,980 | 51,331 |
| Shell products: | | | | | | | | |
| Poultry feed tons | (1) | (1) | (1) | (1) | | | 54,477 | 264,403 |
| Lime do | 950 | 4,175 | (1) | (1) | | | (1) | (1) |
| Unclassified products: | | | | | | | | |
| Packaged, fresh and frozen pounds | [2] 16,000 | [2] 2,200 | | | | | [3] 109,197 | [3] 22,600 |
| Canned standard cases | | | (5) | (5) | (5) | (5) | [6] 18,488 | [6] 123,525 |
| Miscellaneous | | [7] 60,845 | | [8] 92,849 | | [9] 94,522 | | [10] 35,889 |
| Total | | 609,942 | | 526,301 | | 640,996 | | 1,438,418 |
| By fishermen: | | | | | | | | |
| Alewives: | | | | | | | | |
| Corned pounds | 3,542,000 | 37,090 | | | | | | |
| Tight-pack cut do | 54,200 | 2,168 | | | | | | |
| Tight-pack roe do | 103,700 | 5,185 | | | | | | |
| Mullet: | | | | | | | | |
| Salted do | 10,000 | 400 | | | | | | |
| Smoked do | | | | | | | 4,500 | 1,175 |
| Roe, salted do | | | | | | | 153,700 | 9,222 |
| Oysters, fresh shucked gallons | 4,850 | 3,790 | 957 | 957 | 7,335 | 7,335 | 10,319 | 13,298 |
| Scallops, bay, fresh shucked do | 4,000 | 8,000 | | | | | 7,260 | 7,560 |
| Crab meat, packaged, fresh cooked pounds | | | | | | | 5,295 | 1,733 |
| Total | | 56,633 | | 957 | | 7,335 | | 32,988 |
| Grand total | | 666,575 | | 527,258 | | 648,331 | | 1,471,406 |

| Item | Alabama | | Mississippi | | Louisiana | | Texas | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing establishments: | | | | | | | | |
| Mullet, salted pounds | | | (1) | (1) | | | | |
| Crab meat, packaged, fresh cooked pounds | | | 77,500 | $20,025 | 350,778 | $72,144 | | |
| Shrimp: | | | | | | | | |
| Fresh and frozen packaged pounds | | | | | | | 2,299,800 | $379,467 |
| Cooked and peeled do | | | 592,415 | 130,332 | | | 61,399 | 11,162 |
| Sun dried do | | | | | 1,762,974 | 265,344 | | |
| Canned standard cases | (1) | (1) | 161,119 | 671,513 | 520,970 | 2,206,696 | (1) | (1) |
| Meal tons | | | | | 904 | 14,609 | | |
| Oysters: | | | | | | | | |
| Fresh shucked gallons | 15,390 | $19,238 | 54,631 | 92,873 | 207,248 | 313,993 | 74,506 | 109,345 |
| Canned standard cases | (1) | (1) | 195,857 | 822,031 | 49,133 | 201,793 | | |
| Shell products: | | | | | | | | |
| Poultry feed tons | (1) | (1) | 14,029 | 67,745 | (1) | (1) | 19,486 | 86,293 |
| Lime do | (1) | (1) | (1) | (1) | (1) | (1) | (1) | (1) |

See footnotes at end of table.

*Industries related to the fisheries of the South Atlantic and Gulf States, 1934*—Con.

PRODUCTS MANUFACTURED—Continued

| Item | Alabama | | Mississippi | | Louisiana | | Texas | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing establishments—Continued. | | | | | | | | |
| Unclassified products: | | | | | | | | |
| Packaged, fresh and frozen pounds | [4] 22,300 | [4]$4,406 | | | | | | |
| Canned standard cases | (5) | (5) | | | (5) | (5) | (5) | (5) |
| Miscellaneous | | [11]323,797 | | [12] $1,100 | | [13]$430,980 | | [14]$446,052 |
| Total | | 347,441 | | 1,805,619 | | 3,505,559 | | 1,032,319 |
| By fishermen: | | | | | | | | |
| Mullet: | | | | | | | | |
| Salted pounds | 10,000 | 500 | | | | | | |
| Oysters, fresh shucked gallons | 11,360 | 11,915 | 2,614 | 2,614 | | | 8,929 | 10,367 |
| Crab meat, packaged, fresh cooked pounds | 19,700 | 4,925 | | | | | 3,860 | 641 |
| Shrimp, sun dried do | | | | | 7,500 | 825 | | |
| Total | | 17,340 | | 2,614 | | 825 | | 11,008 |
| Grand total | | 364,781 | | 1,808,233 | | 3,506,384 | | 1,043,327 |

[1] This item has been included under "Unclassified products."
[2] Includes fresh fillets of croaker, sea bass and squeteagues, and fresh pandressed croaker.
[3] Includes fresh and frozen fillets of flounders, groupers, mullet, red snapper, snook, spanish mackerel, and squeteagues, and fresh steaks of red snapper.
[4] Includes fresh steaks of grouper and red snapper; and fresh and frozen fillets of flounders, red snapper, spanish mackerel, and squeteagues.
[5] This item has been included under "Miscellaneous."
[6] Includes canned coquina broth, hard-clam products, conch chowder, fish chowder, and turtle products.
[7] Includes corned alewives, salted spot, menhaden fish meal, and oyster-shell poultry feed.
[8] Includes canned shrimp and oyster-shell products.
[9] Includes cooked and peeled shrimp and pickled shrimp; canned oysters and terrapin products; and menhaden products.
[10] Includes fresh-shucked bay scallops; salted mullet roe; smoked fillets of kingfish, mullet, and Spanish mackerel; shark hides, fins and oil; king crab scrap; fish meal; and oyster-shell lime.
[11] Includes canned shrimp and oysters, and oyster-shell products.
[12] Includes salted mullet and oyster-shell lime.
[13] Includes canned frog products and oyster-shell products.
[14] Includes canned shrimp and oyster-shell lime.

NOTE.—The total value of the products for the South Atlantic and Gulf States was as follows: By manufacturing establishments, $9,906,595; and by fishermen, $129,700. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 862 have also been included as fishermen and 203 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

## NORTH CAROLINA

*Fisheries of North Carolina, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines | | Haul seines | | Gill nets | | | |
|---|---|---|---|---|---|---|---|---|
| | Menhaden | Other | Common | Long | Anchor | Drift | Runaround | Stake |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 431 | | 12 | 126 | 51 | 12 | | |
| On boats and shore: | | | | | | | | |
| Regular | 24 | 7 | 864 | 251 | 392 | 235 | 93 | 308 |
| Casual | | | 389 | 71 | 195 | 104 | 110 | 112 |
| Total | 455 | 7 | 1,265 | 448 | 638 | 351 | 203 | 420 |
| Vessels: | | | | | | | | |
| Motor | 28 | | 2 | 37 | 18 | 4 | | |
| Net tonnage | 899 | | 12 | 259 | 113 | 24 | | |
| Boats: | | | | | | | | |
| Motor | 3 | 1 | 171 | 100 | 257 | 108 | 49 | 220 |
| Other | 6 | 2 | 400 | 95 | 152 | 59 | 101 | 137 |
| Accessory boats | 63 | | | 47 | | | | |
| Apparatus: | | | | | | | | |
| Number | 31 | 1 | 412 | 87 | 1,840 | 220 | 159 | 4,931 |
| Length, yards | 7,940 | 175 | 53,160 | 86,475 | | | | |
| Square yards | | | | | 1,128,700 | 469,170 | 66,730 | 388,205 |

*Fisheries of North Carolina, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Lines | | | | Pound nets | Weirs | Wheels | Fyke nets | Dip nets |
|---|---|---|---|---|---|---|---|---|---|
| | Hand | Troll | Trot with baits or snoods | Trot with hooks | | | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | |
| On vessels | 6 | | | | | | | | |
| On boats and shore: | | | | | | | | | |
| Regular | 30 | 70 | 268 | | 309 | | | 11 | 190 |
| Casual | 50 | | 216 | 50 | 226 | 12 | 22 | 24 | 290 |
| Total | 86 | 70 | 484 | 50 | 535 | 12 | 22 | 35 | 480 |
| Vessels: | | | | | | | | | |
| Motor | 1 | | | | | | | | |
| Net tonnage | 10 | | | | | | | | |
| Sail | 1 | | | | | | | | |
| Net tonnage | 8 | | | | | | | | |
| Total, vessels | 2 | | | | | | | | |
| Total, net tonnage | 18 | | | | | | | | |
| Boats: | | | | | | | | | |
| Motor | 40 | 35 | 200 | | 243 | 2 | 14 | 25 | 10 |
| Other | | | 151 | 34 | 192 | 10 | 13 | 14 | 285 |
| Accessory boats | 2 | | | | | | | | |
| Apparatus: | | | | | | | | | |
| Number | 81 | 45 | 423 | 50 | 1,522 | 12 | 33 | 480 | 480 |
| Hooks, baits, or snoods | 172 | 45 | 342,800 | 6,200 | | | | | |

| Item | Otter trawls, shrimp | Pots | | Spears | Dredges, oyster | Tongs, oyster | Rakes, other than for oysters | By hand, other than for oysters | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | Eel | Fish | | | | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | |
| On vessels | 47 | | | | 89 | | | | 723 |
| On boats and shore: | | | | | | | | | |
| Regular | 208 | 10 | | 15 | 106 | 47 | 191 | | 2,620 |
| Casual | 12 | 13 | 43 | 50 | | 202 | 240 | 30 | 2,012 |
| Total | 267 | 23 | 43 | 65 | 195 | 249 | 431 | 30 | 5,355 |
| Vessels: | | | | | | | | | |
| Motor | 20 | | | | | | | | 93 |
| Net tonnage | 132 | | | | | | | | 1,340 |
| Sail | | | | | 29 | | | | 30 |
| Net tonnage | | | | | 290 | | | | 298 |
| Total, vessels | 20 | | | | 29 | | | | 123 |
| Total, net tonnage | 132 | | | | 290 | | | | 1,638 |
| Boats: | | | | | | | | | |
| Motor | 110 | | | | 1 | 18 | | | 1,344 |
| Other | | 23 | 27 | 55 | 52 | 172 | 406 | 30 | 1,829 |
| Accessory boats | | | | | | | | | 112 |
| Apparatus: | | | | | | | | | |
| Number | 130 | 750 | 730 | 65 | 143 | 249 | 431 | | |
| Yards, at mouth | 2,634 | | | | 147 | | | | |

*Fisheries of North Carolina, 1934*—Continued

CATCH: BY GEAR

| Species | Purse seines | | | | Haul seines | | | |
|---|---|---|---|---|---|---|---|---|
| | Menhaden | | Other | | Common | | Long | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | | | 1,053,500 | $10,040 | 377,000 | $3,785 |
| Black bass | | | | | 700 | 37 | 800 | 38 |
| Bluefish | 15,000 | $750 | | | 288,300 | 11,035 | 365,000 | 13,050 |
| Bowfin | | | | | 600 | 6 | | |
| Butterfish | | | | | 27,000 | 440 | | |
| Carp | | | | | 53,000 | 1,920 | 35,000 | 1,700 |
| Catfish and bullheads | | | | | 43,000 | 560 | 27,000 | 390 |
| Croaker | | | | | 503,200 | 5,942 | 3,109,000 | 40,560 |
| Drum, red or redfish | | | | | 26,600 | 562 | 31,000 | 620 |
| Flounders | | | | | 257,700 | 11,905 | 136,000 | 3,625 |
| Gizzard shad | | | | | 5,500 | 53 | 6,500 | 57 |
| Harvestfish or "starfish" | | | | | 51,000 | 570 | 12,000 | 240 |
| Hickory shad | | | | | 7,000 | 380 | | |
| King whiting or "kingfish" | | | | | 104,000 | 2,050 | 5,000 | 50 |
| Menhaden | 106,104,800 | 353,766 | | | 300,000 | 916 | 246,300 | 821 |
| Mullet | 250,000 | 5,000 | | | 2,201,500 | 59,295 | 500 | 15 |
| Pigfish | | | | | 42,000 | 630 | 50,000 | 500 |
| Pike or pickerel | | | | | 200 | 12 | | |
| Pinfish or sailors choice | | | | | 30,000 | 150 | 150,000 | 750 |
| Pompano | | | | | 400 | 60 | | |
| Shad | | | | | 38,000 | 5,820 | | |
| Sheepshead | | | | | 1,400 | 35 | | |
| Spadefish | | | | | 6,000 | 150 | | |
| Spanish mackerel | | | | | 2,800 | 127 | | |
| Spot | | | | | 1,401,000 | 21,610 | 2,525,000 | 39,375 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | | | 443,000 | 8,400 | 1,634,000 | 38,670 |
| Spotted | | | | | 277,500 | 15,165 | 1,345,000 | 69,490 |
| Striped bass | | | 20,000 | $2,000 | 72,500 | 6,725 | 66,800 | 6,680 |
| Sturgeon | | | | | 1,000 | 100 | | |
| Sunfish | | | | | 100 | 1 | | |
| White perch | | | | | 56,000 | 2,300 | 72,000 | 2,820 |
| Yellow perch | | | | | 9,200 | 295 | 200 | 8 |
| Crabs, soft | | | | | 138,000 | 19,200 | | |
| Terrapin, diamond back | | | | | 400 | 75 | | |
| Total | 106,369,800 | 359,516 | 20,000 | 2,000 | 7,442,100 | 186,566 | 10,194,100 | 223,244 |

| Species | Gill nets | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Anchor | | Drift | | Runaround | | Stake | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 751,300 | $6,556 | 225,000 | $1,625 | | | 79,000 | $790 |
| Bluefish | 112,500 | 3,375 | 321,000 | 12,650 | | | 425,000 | 13,350 |
| Butterfish | 3,000 | 60 | | | | | 1,000 | 20 |
| Croaker | 2,261,500 | 26,215 | 300,000 | 3,000 | 10,000 | $100 | 695,000 | 7,150 |
| Drum, red or redfish | 15,000 | 375 | | | | | 26,000 | 525 |
| Gizzard shad | 3,500 | 35 | | | | | | |
| Hickory shad | 46,800 | 2,270 | | | | | 7,500 | 315 |
| King whiting or "kingfish" | 174,000 | 4,650 | | | | | | |
| Mullet | 62,500 | 1,275 | 25,000 | 500 | 1,060,000 | 30,550 | 286,000 | 8,540 |
| Sea bass | 10,000 | 450 | | | 5,000 | 225 | | |
| Shad | 301,300 | 45,845 | 114,000 | 17,020 | | | 275,500 | 41,390 |
| Spanish mackerel | | | | | | | 2,000 | 80 |
| Spot | 110,000 | 1,650 | 30,000 | 600 | 80,000 | 1,450 | 310,000 | 3,800 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 1,263,000 | 41,700 | 240,000 | 7,200 | 10,000 | 250 | 660,000 | 15,875 |
| Spotted | 5,000 | 350 | 14,000 | 740 | 5,000 | 250 | 160,000 | 8,000 |
| Striped bass | 73,800 | 7,380 | 500 | 50 | | | 13,000 | 1,300 |
| Sturgeon | | | 600 | 60 | | | | |
| White perch | 32,000 | 1,140 | | | | | | |
| Total | 5,225,200 | 143,326 | 1,270,100 | 43,445 | 1,170,000 | 32,825 | 2,940,000 | 101,135 |

*Fisheries of North Carolina, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Lines | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Hand | | Troll | | Trot with baits or snoods | | Trot with hooks | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | | | 8,000 | $240 | | | | |
| Catfish and bullheads | | | | | | | 4,500 | $190 |
| Cero | | | 4,400 | 220 | | | | |
| Sea bass | 60,000 | $2,350 | | | | | | |
| Spanish mackerel | | | 22,000 | 1,100 | | | | |
| Striped bass | | | | | | | 20,000 | 2,000 |
| Crabs, hard | | | | | 4,543,600 | $67,238 | | |
| Total | 60,000 | 2,350 | 34,400 | 1,560 | 4,543,600 | 67,238 | 24,500 | 2,190 |

| Species | Pound nets | | Weirs | | Wheels | | Fyke nets | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 11,850,200 | $64,995 | | | 450,000 | $2,500 | 11,000 | $110 |
| Bluefish | 231,700 | 9,065 | | | | | | |
| Butterfish | 12,500 | 225 | | | | | | |
| Carp | 6,500 | 129 | 3,000 | $90 | | | 11,100 | 477 |
| Catfish and bullheads | 25,100 | 673 | | | | | 63,000 | 1,360 |
| Croaker | 804,100 | 8,091 | | | | | | |
| Drum, red or redfish | 33,900 | 668 | | | | | | |
| Eels | | | | | | | 4,900 | 194 |
| Flounders | 567,900 | 25,897 | | | | | 900 | 33 |
| Gizzard shad | 5,500 | 55 | | | | | 3,000 | 30 |
| Harvestfish or "starfish" | 757,000 | 11,515 | | | | | | |
| Hickory shad | 36,400 | 1,569 | | | | | 2,000 | 100 |
| King whiting or "kingfish" | 11,000 | 330 | | | | | | |
| Mullet | 3,800 | 114 | | | | | | |
| Pike or pickerel | | | | | | | 1,000 | 54 |
| Sea bass | 400 | 20 | | | | | | |
| Shad | 545,200 | 83,112 | | | | | | |
| Sheepshead | 2,300 | 45 | | | | | | |
| Spanish mackerel | 20,900 | 1,051 | | | | | | |
| Spot | 332,000 | 4,550 | | | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 3,479,400 | 68,493 | | | | | | |
| Spotted | 42,600 | 2,170 | | | | | | |
| Striped bass | 92,400 | 9,240 | | | | | 3,000 | 300 |
| White perch | 133,200 | 4,053 | | | | | 24,000 | 780 |
| Yellow perch | 1,500 | 35 | | | | | 6,300 | 142 |
| Total | 18,995,500 | 296,095 | 3,000 | 90 | 450,000 | 2,500 | 130,200 | 3,580 |

| Species | Dip nets | | Otter trawls, shrimp | | Pots | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Eel | | Fish | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 100,000 | $500 | | | | | | |
| Eels | | | | | 39,400 | $1,849 | | |
| Flounders | | | 6,000 | $120 | | | | |
| King whiting or "kingfish" | | | 8,000 | 160 | | | | |
| White perch | | | | | | | 205,000 | $11,250 |
| Crabs, soft | 113,400 | 17,010 | | | | | | |
| Shrimp | | | 2,563,900 | 80,367 | | | | |
| Total | 213,400 | 17,510 | 2,577,900 | 80,647 | 39,400 | 1,849 | 205,000 | 11,250 |

| Species | Spears | | Dredges | | Tongs | | Rakes | | By hand | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders | 19,000 | $570 | | | | | | | | |
| Clams, hard, public | | | | | | | 330,000 | $32,647 | 8,000 | $1,000 |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | 254,300 | $10,202 | 182,400 | $7,915 | | | | |
| Market, public, fall | | | 512,600 | 24,030 | 186,700 | 9,095 | | | | |
| Market, private, spring | | | | | 21,700 | 1,550 | | | | |
| Market, private, fall | | | | | 3,000 | 300 | | | | |
| Scallops, bay | | | | | | | 36,000 | 6,000 | | |
| Total | 19,000 | 570 | 766,900 | 34,232 | 393,800 | 18,860 | 366,000 | 38,647 | 8,000 | 1,000 |

*Fisheries of North Carolina, 1934*—Continued

OPERATING UNITS: BY COUNTIES

| Item | Beaufort | Bertie | Bladen | Brunswick | Camden | Carteret | Chowan | Craven |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 14 | | | 67 | | 590 | | |
| On boats and shore: | | | | | | | | |
| Regular | 176 | | | 255 | | 759 | | 42 |
| Casual | 42 | 110 | 30 | 100 | 9 | 285 | 152 | 72 |
| Total | 232 | 110 | 30 | 422 | 9 | 1,634 | 152 | 114 |
| Vessels: | | | | | | | | |
| Motor | | | | 8 | | 85 | | |
| Net tonnage | | | | 172 | | 1,168 | | |
| Sail | 5 | | | | | 9 | | |
| Net tonnage | 58 | | | | | 77 | | |
| Total vessels | 5 | | | 8 | | 94 | | |
| Total net tonnage | 58 | | | 172 | | 1,245 | | |
| Boats: | | | | | | | | |
| Motor | 87 | 32 | 15 | 108 | 7 | 210 | 55 | 40 |
| Other | 83 | 37 | | 97 | 7 | 520 | 55 | 35 |
| Accessory boats | | | | 6 | | 106 | | |
| Apparatus: | | | | | | | | |
| Purse seines: | | | | | | | | |
| Menhaden | | | | 3 | | 28 | | |
| Length, yards | | | | 840 | | 7,100 | | |
| Haul seines: | | | | | | | | |
| Common | 11 | | | 17 | | 219 | | 9 |
| Length, yards | 4,000 | | | 2,450 | | 8,140 | | 2,100 |
| Long | 3 | 2 | | | | 29 | | |
| Length, yards | 3,200 | 3,075 | | | | 33,700 | | |
| Gill nets: | | | | | | | | |
| Anchor | 4 | | | 50 | 50 | 103 | 245 | |
| Square yards | 2,000 | | | 45,000 | 10,000 | 181,800 | 122,500 | |
| Drift | | | 15 | 15 | | 4 | | 6 |
| Square yards | | | 15,000 | 21,000 | | 11,430 | | 900 |
| Runaround | 7 | | | 40 | | 23 | | 5 |
| Square yards | 4,900 | | | 16,000 | | 4,600 | | 2,500 |
| Stake | 100 | | | | | 870 | | 190 |
| Square yards | 7,000 | | | | | 48,400 | | 10,140 |
| Lines: | | | | | | | | |
| Hand | | | | 15 | | 6 | | |
| Hooks | | | | 30 | | 12 | | |
| Troll | | | | | | 45 | | |
| Hooks | | | | | | 45 | | |
| Trot with baits or snoods | 122 | | | | | 6 | | |
| Baits or snoods | 94,500 | | | | | 4,800 | | |
| Pound nets | 95 | 144 | | | | 80 | 350 | 50 |
| Wheels | | 6 | | | | | | |
| Fyke nets | | | | | 40 | | | |
| Dip nets | | | | | | 330 | | |
| Otter trawls, shrimp | | | | 65 | | 59 | | |
| Yards at mouth | | | | 1,285 | | 1,229 | | |
| Pots, fish | | 40 | | | | | | |
| Spears | | | | 15 | | | | |
| Dredges, oyster | 42 | | | | | 19 | | |
| Yards at mouth | 44 | | | | | 19 | | |
| Tongs, oyster | | | | 20 | | 132 | | |
| Rakes, other than for oysters | | | | | | 251 | | |

| Item | Currituck | Dare | Gates | Hertford | Hyde | Lenoir | Martin | New Hanover |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | 2 | | | |
| On boats and shore: | | | | | | | | |
| Regular | 118 | 666 | | | 120 | | | 95 |
| Casual | 160 | 10 | 18 | 8 | | 8 | 233 | 72 |
| Total | 278 | 676 | 18 | 8 | 122 | 8 | 233 | 167 |
| Vessels: | | | | | | | | |
| Sail | | | | | 1 | | | |
| Net tonnage | | | | | 6 | | | |
| Boats: | | | | | | | | |
| Motor | 121 | 270 | 2 | 2 | 77 | 2 | 19 | 13 |
| Other | 129 | 226 | 12 | 2 | 41 | 2 | 124 | 108 |
| Apparatus: | | | | | | | | |
| Purse seines: | | | | | | | | |
| Other | | 1 | | | | | | |
| Length, yards | | 175 | | | | | | |
| Haul seines: | | | | | | | | |
| Common | 44 | 50 | | | | | 3 | 15 |
| Length, yards | 9,050 | 15,800 | | | | | 1,000 | 1,800 |
| Long | 13 | 30 | | | | | | |
| Length, yards | 10,400 | 26,100 | | | | | | |

*Fisheries of North Carolina, 1934*—Continued

OPERATING UNITS: BY COUNTIES—Continued

| Item | Currituck | Dare | Gates | Hertford | Hyde | Lenoir | Martin | New Hanover |
|---|---|---|---|---|---|---|---|---|
| Apparatus—Continued. | | | | | | | | |
| Gill nets: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Anchor | 98 | 253 | | | 7 | | | |
| Square yards | 42,800 | 149,800 | | | 9,400 | | | |
| Drift | | 62 | | | | | 32 | 75 |
| Square yards | | 310,000 | | | | | 2,540 | 105,000 |
| Runaround | | 12 | | | 10 | | | 4 |
| Square yards | | 7,200 | | | 5,330 | | | 1,400 |
| Stake | | 2,550 | 10 | | 964 | 10 | | |
| Square yards | | 244,000 | 1,000 | | 61,250 | 400 | | |
| Lines: | | | | | | | | |
| Hand | | | | | | | | 20 |
| Hooks | | | | | | | | 40 |
| Trot with baits or snoods | 110 | 15 | | | 20 | | | |
| Baits or snoods | 104,000 | 12,000 | | | 15,000 | | | |
| Trot with hooks | | | | | | | 38 | 12 |
| Hooks | | | | | | | 3,800 | 2,400 |
| Pound nets | 7 | 383 | 23 | 36 | 45 | | | |
| Weirs | | | | | | | 12 | |
| Wheels | | | | | | | 27 | |
| Fyke nets | 355 | | | | | | | |
| Dip nets | | | | | | | 150 | |
| Pots: | | | | | | | | |
| Eel | 600 | 50 | | | | | 50 | |
| Fish | | | | | | | 690 | |
| Dredges, oyster | | | | | 22 | | | |
| Yards at mouth | | | | | 22 | | | |
| Tongs, oyster | | 10 | | | | | | |
| Rakes, other than for oysters | | | | | | | | 60 |

| Item | Onslow | Pamlico | Pasquotank | Pender | Perquimans | Tyrrell | Washington |
|---|---|---|---|---|---|---|---|
| Fisherman: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 3 | 41 | 6 | | | | |
| On boats and shore: | | | | | | | |
| Regular | 64 | 112 | 50 | 144 | | 19 | |
| Casual | 165 | 171 | | 130 | 54 | 82 | 101 |
| Total | 232 | 324 | 56 | 274 | 54 | 101 | 101 |
| Vessels: | | | | | | | |
| Sail | 1 | 12 | 2 | | | | |
| Net tonnage | 8 | 111 | 38 | | | | |
| Boats: | | | | | | | |
| Motor | 66 | 91 | 24 | 9 | 27 | 42 | 25 |
| Other | 95 | 100 | 24 | 26 | 27 | 45 | 34 |
| Apparatus: | | | | | | | |
| Haul seines: | | | | | | | |
| Common | 24 | | | 18 | | | 2 |
| Length, yards | 4,070 | | | 2,850 | | | 1,900 |
| Long | | 10 | | | | | |
| Length, yards | | 10,000 | | | | | |
| Gill nets: | | | | | | | |
| Anchor | 18 | | 186 | | 386 | 200 | 240 |
| Square yards | 20,000 | | 49,800 | | 231,600 | 120,000 | 144,000 |
| Drift | | | | | | | 11 |
| Square yards | | | | | | | 3,300 |
| Runaround | 50 | | | 8 | | | |
| Square yards | 21,600 | | | 3,200 | | | |
| Stake | | 155 | 20 | | | 62 | |
| Square yards | | 5,575 | 3,000 | | | 7,440 | |
| Lines: | | | | | | | |
| Hand | 40 | | | | | | |
| Hooks | 90 | | | | | | |
| Trot with baits or snoods | 60 | 90 | | | | | |
| Baits or snoods | 45,000 | 67,500 | | | | | |
| Pound nets | | 145 | 25 | | 18 | 85 | 36 |
| Fyke nets | | | 50 | | | 35 | |
| Otter trawls, shrimp | | 6 | | | | | |
| Yards at mouth | | 120 | | | | | |
| Pots, eel | | 50 | | | | | |
| Spears | 30 | | | 20 | | | |
| Dredges, oyster | | 56 | 4 | | | | |
| Yards at mouth | | 56 | 6 | | | | |
| Tongs, oyster | 40 | 37 | | 10 | | | |
| Rakes, other than for oysters | 10 | | | 110 | | | |

*Fisheries of North Carolina, 1934*—Continued

CATCH: BY COUNTIES

| Species | Beaufort | | Bertie | | Bladen | | Brunswick | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 677,400 | $4,524 | 5,468,800 | $31,306 | | | | |
| Bluefish | 700 | 25 | | | | | | |
| Carp | 7,500 | 75 | 200 | 6 | | | 55,000 | $1,950 |
| Catfish and bullheads | 30,000 | 300 | 7,000 | 210 | | | | |
| Croaker | 129,600 | 1,596 | | | | | | |
| Drum, red or redfish | 1,000 | 20 | | | | | 20,000 | 200 |
| Flounders | 32,600 | 978 | | | | | 600 | 12 |
| Harvestfish or "starfish" | 62,000 | 890 | | | | | 18,000 | 480 |
| Hickory shad | 5,000 | 250 | 400 | 24 | | | | |
| King whiting or "kingfish" | | | | | | | | |
| Menhaden | | | | | | | 12,500 | 295 |
| Mullet | 76,000 | 1,680 | | | | | 20,458,200 | 68,192 |
| Sea bass | | | | | | | 700,000 | 14,000 |
| Shad | | | | | | | 25,000 | 1,125 |
| Spanish mackerel | 49,200 | 7,672 | 18,900 | 2,935 | 6,000 | $900 | 41,500 | 6,225 |
| Spot | 1,400 | 56 | | | | | | |
| Squeteagues or "sea trout": | 26,000 | 395 | | | | | | |
| Gray | | | | | | | 123,000 | 2,490 |
| Spotted | 317,400 | 5,358 | | | | | | |
| Striped bass | 30,000 | 1,150 | | | | | | |
| Sturgeon | 24,900 | 1,965 | 20,900 | 2,090 | | | 1,500 | 135 |
| White perch | 1,000 | 100 | | | | | | |
| Yellow perch | 12,000 | 480 | 12,000 | 540 | | | | |
| Crabs, hard | 7,500 | 225 | | | | | | |
| Shrimp | 1,655,000 | 24,825 | | | | | | |
| Clams, hard, public | | | | | | | 1,309,900 | 40,547 |
| Oysters: | | | | | | | | |
| Market, public, spring | 55,000 | 2,360 | | | | | 8,000 | 1,000 |
| Market, public, fall | 185,000 | 8,360 | | | | | | |
| | | | | | | | 15,000 | 750 |
| Total | 3,386,200 | 63,284 | 5,528,200 | 37,111 | 6,000 | 900 | 22,788,200 | 137,401 |

| Species | Camden | | Carteret | | Chowan | | Craven | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 26,000 | $260 | 5,500 | $55 | 4,671,300 | $23,356 | 45,000 | $450 |
| Bluefish | | | 363,500 | 10,905 | | | 12,000 | 240 |
| Butterfish | | | 7,000 | 140 | | | | |
| Carp | 600 | 12 | | | | | | |
| Catfish and bullheads | 12,000 | 240 | | | 4,100 | 123 | | |
| Cero | | | 4,400 | 220 | | | | |
| Croaker | | | 4,541,000 | 59,340 | | | 55,000 | 550 |
| Drum, red or redfish | | | 37,000 | 875 | | | 5,000 | 100 |
| Flounders | | | 68,900 | 2,606 | | | 6,000 | 180 |
| Gizzard shad | 1,500 | 15 | | | | | | |
| Harvestfish or "starfish" | | | 128,000 | 1,960 | | | 60,000 | 900 |
| Hickory shad | 300 | 15 | 11,500 | 265 | 2,500 | 125 | 2,500 | 50 |
| King whiting or "kingfish" | | | 95,500 | 2,865 | | | | |
| Menhaden | | | 86,192,900 | 287,311 | | | | |
| Mullet | 2,500 | 75 | 1,154,000 | 34,580 | | | 400,000 | 10,000 |
| Pigfish | | | 92,000 | 1,130 | | | | |
| Pike or pickerel | 400 | 18 | | | | | | |
| Pinfish or sailors choice | | | 180,000 | 900 | | | | |
| Pompano | | | 400 | 60 | | | | |
| Sea bass | | | 5,000 | 150 | | | | |
| Shad | 3,000 | 450 | 115,000 | 18,400 | 65,300 | 9,795 | 68,500 | 10,060 |
| Sheepshead | | | 2,900 | 65 | | | 800 | 15 |
| Spadefish | | | 6,000 | 150 | | | | |
| Spanish mackerel | | | 32,000 | 1,580 | | | 5,000 | 250 |
| Spot | | | 3,221,000 | 47,340 | | | 12,000 | 180 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | 3,067,000 | 78,885 | | | 700,000 | 10,500 |
| Spotted | | | 613,000 | 32,880 | | | 50,000 | 3,500 |
| Striped bass | 3,000 | 300 | 800 | 80 | 18,700 | 1,870 | 6,500 | 650 |
| White perch | 16,000 | 480 | | | 18,000 | 540 | | |
| Yellow perch | 1,000 | 20 | 200 | 8 | | | | |
| Crabs: | | | | | | | | |
| Hard | | | 136,200 | 2,042 | | | | |
| Soft | | | 231,400 | 34,710 | | | | |
| Shrimp | | | 1,204,000 | 38,320 | | | | |
| Clams, hard, public | | | 254,000 | 23,447 | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | 114,600 | 5,294 | | | | |
| Market, public, fall | | | 169,800 | 8,510 | | | | |
| Market, private, spring | | | 4,200 | 300 | | | | |
| Market, private, fall | | | 3,000 | 300 | | | | |
| Scallops, bay | | | 36,000 | 6,000 | | | | |
| Terrapin, diamond back | | | 400 | 75 | | | | |
| Total | 66,300 | 1,885 | 102,098,100 | 701,748 | 4,779,900 | 35,809 | 1,428,300 | 37,625 |

*Fisheries of North Carolina, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Currituck | | Dare | | Gates | | Hertford | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 2,000 | $40 | 45,000 | $300 | 150,000 | $750 | 175,000 | $875 |
| Black bass | 1,500 | 75 | | | | | | |
| Bluefish | 300 | 15 | 1,020,000 | 40,850 | | | | |
| Bowfin | 600 | 6 | | | | | | |
| Butterfish | | | 24,000 | 380 | | | | |
| Carp | 80,000 | 3,760 | 11,000 | 220 | | | | |
| Catfish and bullheads | 29,000 | 580 | 24,000 | 330 | | | | |
| Croaker | 7,200 | 72 | 1,075,000 | 10,750 | | | | |
| Drum, red or redfish | | | 58,000 | 1,110 | | | | |
| Eels | 38,400 | 1,539 | 1,500 | 150 | | | | |
| Flounders | 4,400 | 198 | 672,000 | 33,260 | | | | |
| Gizzard shad | 12,000 | 110 | | | | | | |
| Harvestfish or "starfish" | | | 115,000 | 1,725 | | | | |
| Hickory shad | | | 18,500 | 925 | | | | |
| King whiting or "kingfish" | 7,000 | 280 | 81,000 | 1,230 | | | | |
| Mullet | 1,000 | 30 | 168,000 | 5,040 | | | | |
| Pike or pickerel | 400 | 30 | | | | | | |
| Shad | 31,300 | 5,345 | 511,500 | 76,625 | 2,500 | 375 | 300 | 45 |
| Spanish mackerel | 100 | 5 | 3,300 | 192 | | | | |
| Spot | 15,000 | 300 | 455,000 | 7,075 | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 5,000 | 200 | 1,760,000 | 43,875 | | | | |
| Spotted | 7,000 | 690 | 1,004,000 | 50,200 | | | | |
| Striped bass | 47,500 | 4,750 | 116,000 | 11,600 | | | 200 | 20 |
| Sunfish | 100 | 1 | | | | | | |
| White perch | 92,700 | 3,608 | 30,000 | 1,100 | | | | |
| Yellow perch | 2,000 | 82 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | 988,900 | 14,833 | 366,000 | 4,575 | | | | |
| Soft | 20,000 | 1,500 | | | | | | |
| Oysters, market, public, spring | | | 3,200 | 125 | | | | |
| Total | 1,293,400 | 38,049 | 7,562,000 | 291,737 | 152,500 | 1,125 | 175,500 | 940 |

| Species | Hyde | | Lenoir | | Martin | | New Hanover | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | | | 875,000 | $4,375 | | |
| Bluefish | 305,500 | $9,165 | | | | | 1,000 | $50 |
| Butterfish | 2,500 | 75 | | | | | | |
| Carp | | | | | 3,000 | 90 | | |
| Catfish and bullheads | | | | | | | 4,500 | 190 |
| Croaker | 915,000 | 9,150 | | | | | | |
| Eels | | | | | 2,500 | 250 | | |
| Flounders | 59,000 | 1,770 | | | | | 8,000 | 400 |
| Harvestfish or "starfish" | 165,000 | 2,500 | | | | | | |
| Mullet | 150,000 | 6,000 | | | | | 325,000 | 6,500 |
| Sea bass | | | | | | | 20,000 | 700 |
| Shad | 7,700 | 1,195 | 1,000 | $150 | | | 81,000 | 12,150 |
| Spanish mackerel | 3,500 | 175 | | | | | 2,000 | 80 |
| Spot | 187,000 | 1,870 | | | | | 130,000 | 2,600 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 962,000 | 23,060 | | | | | | |
| Spotted | 17,600 | 830 | | | | | 4,000 | 240 |
| Striped bass | | | 2,500 | 250 | 20,000 | 2,000 | | |
| Sturgeon | | | | | | | 600 | 60 |
| White perch | | | | | 200,000 | 11,000 | | |
| Crabs, hard | 135,000 | 2,025 | | | | | | |
| Clams, hard, public | | | | | | | 52,000 | 6,500 |
| Oysters: | | | | | | | | |
| Market, public, spring | 37,500 | 1,450 | | | | | | |
| Market, public, fall | 25,000 | 1,100 | | | | | | |
| Total | 2,972,300 | 60,365 | 3,500 | 400 | 1,100,500 | 17,715 | 628,100 | 29,470 |

*Fisheries of North Carolina, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Onslow | | Pamlico | | Pasquotank | | Pender | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | 11,000 | $110 | 12,000 | $120 | | |
| Bluefish | | | 8,500 | 315 | | | | |
| Butterfish | | | 10,000 | 150 | | | | |
| Carp | | | | | 1,800 | 18 | | |
| Catfish and bullheads | | | | | 33,000 | 660 | | |
| Croaker | 80,000 | $800 | 860,000 | 8,600 | | | | |
| Drum, red or redfish | | | 30,900 | 633 | | | | |
| Eels | | | 900 | 54 | 1,000 | 50 | | |
| Flounders | 14,000 | 370 | 99,000 | 1,740 | 600 | 18 | 5,000 | $150 |
| Gizzard shad | | | | | 3,500 | 35 | | |
| Harvestfish or "starfish" | | | 290,000 | 4,350 | | | | |
| Hickory shad | | | 7,500 | 375 | 7,000 | 350 | | |
| King whiting or "kingfish" | 106,000 | 2,570 | | | | | | |
| Mullet | 360,000 | 10,800 | 100,800 | 3,024 | 2,000 | 60 | 450,000 | 13,500 |
| Pike or pickerel | | | | | 400 | 18 | | |
| Sea bass | 25,000 | 1,050 | 400 | 20 | | | | |
| Shad | | | 74,600 | 11,190 | 31,500 | 4,725 | | |
| Spanish mackerel | | | 400 | 20 | | | | |
| Spot | 230,000 | 3,450 | 89,000 | 2,835 | | | 300,000 | 4,560 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 28,000 | 860 | 890,000 | 17,850 | | | | |
| Spotted | 10,000 | 700 | 112,000 | 5,840 | | | | |
| Striped bass | | | | | 5,000 | 500 | | |
| White perch | | | | | 4,500 | 135 | | |
| Yellow perch | | | | | 1,500 | 45 | | |
| Crabs, hard | 262,500 | 3,938 | 1,000,000 | 15,000 | | | | |
| Shrimp | | | 50,000 | 1,500 | | | | |
| Clams, hard, public | 12,000 | 1,200 | | | | | 12,000 | 1,500 |
| Oysters: | | | | | | | | |
| Market, public, spring | 24,000 | 1,000 | 181,900 | 7,058 | 14,500 | 580 | 6,000 | 250 |
| Market, public, fall | 17,700 | 975 | 259,200 | 12,150 | 27,600 | 1,280 | | |
| Market, private, spring | 17,500 | 1,250 | | | | | | |
| Total | 1,186,700 | 28,963 | 4,076,100 | 92,814 | 145,900 | 8,594 | 773,000 | 19,900 |

| Species | Perquimans | | Tyrrell | | Washington | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 20,000 | $1,000 | 1,280,000 | $9,050 | 1,433,000 | $14,330 |
| Carp | | | | | 4,500 | 135 |
| Catfish and bullheads | | | 17,000 | 440 | 2,000 | 100 |
| Gizzard shad | 7,000 | 70 | | | | |
| Hickory shad | 6,500 | 325 | 2,000 | 100 | 36,000 | 1,830 |
| Shad | 50,000 | 7,500 | 50,000 | 7,500 | 65,200 | 9,850 |
| Striped bass | 12,000 | 1,200 | 37,000 | 3,700 | 47,000 | 4,700 |
| White perch | 10,000 | 300 | 23,000 | 660 | 104,000 | 3,500 |
| Yellow perch | | | 5,000 | 100 | | |
| Total | 105,500 | 10,395 | 1,414,000 | 21,550 | 1,691,700 | 34,445 |

SEED OYSTER FISHERY: BY GEAR

| Item | Oyster dredges | |
|---|---|---|
| OPERATING UNITS | | |
| | *Number* | |
| Fishermen, on boats and shore—regular | 12 | |
| Boats, sail | 6 | |
| Apparatus, number | 12 | |
| Yards at mouth | 12 | |
| CATCH | | |
| | *Bushels* | *Value* |
| Oysters, seed, public, spring | 17,450 | $2,617 |

NOTE.—Of the persons and gear employed in the seed oyster fishery all are duplicated among those in the market oyster fishery or fisheries for other species. The seed oyster fishery in North Carolina is confined to Hyde County.

## SOUTH CAROLINA

*Fisheries of South Carolina, 1934*

OPERATING UNITS: By gear

| Item | Haul seines | Gill nets | | | Lines | | Otter trawls, shrimp |
|---|---|---|---|---|---|---|---|
| | | Anchor | Drift | Runa-round | Hand | Trot with baits or snoods | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | 10 | | 10 |
| On boats and shore: | | | | | | | |
| Regular | 10 | 32 | 63 | 10 | 120 | 6 | 82 |
| Casual | 178 | 129 | 507 | 12 | 45 | | |
| Total | 188 | 161 | 570 | 22 | 175 | 6 | 92 |
| Vessels, motor | | | | | 2 | | 3 |
| Net tonnage | | | | | 20 | | 47 |
| Boats: | | | | | | | |
| Motor | | 20 | 15 | 2 | 12 | | 41 |
| Other | 31 | 99 | 265 | 8 | 58 | 6 | |
| Apparatus: | | | | | | | |
| Number | 27 | 190 | 285 | 16 | 175 | 6 | 50 |
| Length, yards | 3,880 | | | | | | |
| Square yards | | 129,296 | 217,120 | 4,050 | | | |
| Yards at mouth | | | | | | | 1,009 |
| Hooks, baits, or snoods | | | | | 495 | 4,500 | |

| Item | Spears | Tongs, oyster | Rakes, clam | Grabs | By hand | Total, exclusive of duplication |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | | 20 |
| On boats and shore: | | | | | | |
| Regular | 10 | | | 269 | | 596 |
| Casual | 10 | 11 | 2 | 48 | 55 | 877 |
| Total | 20 | 11 | 2 | 317 | 55 | 1,493 |
| Vessels, motor | | | | | | 5 |
| Net tonnage | | | | | | 67 |
| Boats: | | | | | | |
| Motor | | | | 6 | | 94 |
| Other | 20 | 11 | 2 | 297 | 38 | 762 |
| Apparatus, number | 20 | 11 | 2 | 317 | | |

CATCH: By gear

| Species | Haul seines | | Gill nets | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Anchor | | Drift | | Runaround | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Drum, red or redfish | 3,500 | $105 | | | | | | |
| Flounders | 9,500 | 455 | | | | | | |
| Hickory shad | | | 1,500 | $150 | 3,000 | $300 | | |
| King whiting or "kingfish" | 6,500 | 195 | | | | | 2,000 | $60 |
| Mullet | 600,000 | 16,500 | | | | | 100,000 | 2,500 |
| Sea bass | 25,000 | 1,250 | | | | | | |
| Shad | | | 98,600 | 14,790 | 110,000 | 16,500 | | |
| Spot | 8,500 | 255 | | | | | 2,000 | 60 |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 1,000 | 70 | | | | | | |
| Spotted | 2,500 | 175 | | | | | | |
| Sturgeon | | | 50,000 | 3,500 | | | | |
| Terrapin, diamond back | 3,000 | 300 | | | | | | |
| Total | 659,500 | 19,305 | 150,100 | 18,440 | 113,000 | 16,800 | 104,000 | 2,620 |

*Fisheries of South Carolina, 1934*—Continued

CATCH: By gear—Continued

| Species | Lines | | | | Otter trawls, shrimp | | Spears | |
|---|---|---|---|---|---|---|---|---|
| | Hand | | Trot with baits or snoods | | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | 3,000 | $180 | | | | | | |
| Flounders | 8,500 | 375 | | | | | 13,500 | $945 |
| Grunts | 9,100 | 273 | | | | | | |
| King whiting or "kingfish" | 5,500 | 165 | | | | | | |
| Sea bass | 71,200 | 3,110 | | | 10,000 | $200 | | |
| Sharks | 12,000 | 120 | | | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | 1,000 | 60 | | | | | | |
| Spotted | 11,000 | 770 | | | | | | |
| Crabs, hard | | | 8,000 | $160 | | | | |
| Shrimp | | | | | 1,801,400 | 54,042 | | |
| Octopus | 1,500 | 90 | | | | | | |
| Total | 122,800 | 5,143 | 8,000 | 160 | 1,811,400 | 54,242 | 13,500 | 945 |

| Species | Tongs | | Rakes | | Grabs | | By hand | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Clams, hard | | | 600 | $75 | | | 46,400 | $5,787 |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | 1,328,300 | $41,307 | 800 | 40 |
| Market, public, fall | | | | | 470,600 | 17,639 | 900 | 45 |
| Market, private, spring | 17,400 | $870 | | | 594,800 | 20,099 | 2,400 | 1,200 |
| Market, private, fall | 21,000 | 1,050 | | | 422,700 | 18,024 | 3,000 | 1,500 |
| Total | 38,400 | 1,920 | 600 | 75 | 2,816,400 | 97,069 | 53,500 | 8,572 |

OPERATING UNITS: By counties

| Item | Beaufort | Charleston | Colleton | Georgetown | Horry | Jasper |
|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | |
| On vessels | | 20 | | | | |
| On boats and shore: | | | | | | |
| Regular | 243 | 222 | | 121 | 10 | |
| Casual | 215 | 205 | 145 | 90 | 196 | 26 |
| Total | 458 | 447 | 145 | 211 | 206 | 26 |
| Vessels, motor | | 5 | | | | |
| Net tonnage | | 67 | | | | |
| Boats: | | | | | | |
| Motor | 48 | 18 | 7 | 21 | | |
| Other | 266 | 239 | 73 | 92 | 66 | 26 |
| Apparatus: | | | | | | |
| Haul seines | 8 | 2 | | 3 | 14 | |
| Length, yards | 680 | 100 | | 600 | 2,500 | |
| Gill nets: | | | | | | |
| Anchor | 40 | 32 | 38 | 80 | | |
| Square yards | 9,200 | 7,320 | 8,776 | 104,000 | | |
| Drift | 77 | 64 | 60 | 59 | 25 | |
| Square yards | 56,900 | 44,800 | 41,120 | 59,000 | 15,300 | |
| Runaround | | | | 10 | 6 | |
| Square yards | | | | 2,500 | 1,550 | |
| Lines: | | | | | | |
| Hand | 25 | 130 | | | 20 | |
| Hooks | 25 | 430 | | | 40 | |
| Trot with baits or snoods | | 6 | | | | |
| Baits or snoods | | 4,500 | | | | |
| Otter trawls, shrimp | 32 | 15 | | 3 | | |
| Yards at mouth | 640 | 309 | | 60 | | |
| Spears | | | | 10 | 10 | |
| Tongs, oyster | | 11 | | | | |
| Rakes, clam | 2 | | | | | |
| Grabs | 183 | 108 | | | | 26 |

*Fisheries of South Carolina, 1934*—Continued

CATCH: BY COUNTIES

| Species | Beaufort | | Charleston | | Colleton | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | | | 3,000 | $180 | | |
| Flounders | 14,000 | $560 | 1,000 | 60 | | |
| Grunts | | | 9,100 | 273 | | |
| King whiting or "kingfish" | | | 4,000 | 120 | | |
| Sea bass | 50,000 | 2,500 | 45,000 | 1,800 | | |
| Shad | 22,500 | 3,375 | 38,400 | 5,760 | 39,200 | $5,880 |
| Sharks | | | 12,000 | 120 | | |
| Squeteagues or "sea trout": | | | | | | |
| Gray | | | 1,000 | 60 | | |
| Spotted | | | 8,000 | 560 | | |
| Sturgeon | | | | | 8,300 | 581 |
| Crabs, hard | | | 8,000 | 160 | | |
| Shrimp | 1,427,600 | 42,828 | 283,600 | 8,508 | | |
| Clams, hard | 600 | 75 | | | | |
| Octopus | | | 1,500 | 90 | | |
| Oysters: | | | | | | |
| Market, public, spring | 950,500 | 29,974 | 377,800 | 11,333 | | |
| Market, public, fall | 296,000 | 11,102 | 174,600 | 6,537 | | |
| Market, private, spring | 72,200 | 4,691 | 510,000 | 15,858 | | |
| Market, private, fall | 118,100 | 7,253 | 280,000 | 10,891 | | |
| Terrapin, diamond back | 2,000 | 150 | 1,000 | 150 | | |
| Total | 2,953,500 | 102,508 | 1,758,000 | 62,460 | 47,500 | 6,461 |

| Species | Georgetown | | Horry | | Jasper | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Drum, red or redfish | | | 3,500 | $105 | | |
| Flounders | 6,000 | $420 | 10,500 | 735 | | |
| Hickory shad | 3,300 | 330 | 1,200 | 120 | | |
| King whiting or "kingfish" | 2,000 | 60 | 8,000 | 240 | | |
| Mullet | 200,000 | 4,000 | 500,000 | 15,000 | | |
| Sea bass | 10,000 | 200 | 1,200 | 60 | | |
| Shad | 103,200 | 15,480 | 5,300 | 795 | | |
| Spot | 6,000 | 180 | 4,500 | 135 | | |
| Squeteagues or "sea trout": | | | | | | |
| Gray | | | 1,000 | 70 | | |
| Spotted | | | 5,500 | 385 | | |
| Sturgeon | 41,700 | 2,919 | | | | |
| Shrimp | 90,200 | 2,706 | | | | |
| Clams, hard | 9,600 | 1,194 | 36,800 | 4,593 | | |
| Oysters: | | | | | | |
| Market, public, spring | 800 | 40 | | | | |
| Market, public, fall | 900 | 45 | | | | |
| Market, private, spring | | | | | 32,400 | $1,620 |
| Market, private, fall | | | | | 48,600 | 2,430 |
| Total | 473,700 | 27,574 | 577,500 | 22,238 | 81,000 | 4,050 |

## GEORGIA

*Fisheries of Georgia, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines, menhaden | Haul seines | Gill nets | | | | Lines | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Anchor | Drift | Run-around | Stake | Hand | Trot with baits or snoods | Trot with hooks |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 50 | | | | | | | | |
| On boats and shore: | | | | | | | | | |
| Regular | | | | | 20 | | 3 | 32 | |
| Casual | | 18 | 50 | 330 | | 10 | 36 | | 40 |
| Total | 50 | 18 | 50 | 330 | 20 | 10 | 39 | 32 | 40 |
| Vessels, motor | 2 | | | | | | | | |
| Net tonnage | 108 | | | | | | | | |
| Boats. | | | | | | | | | |
| Motor | | | | 3 | 10 | | 1 | | |
| Other | | 9 | 47 | 165 | 10 | 5 | 16 | 32 | 40 |
| Accessory boats | 6 | | | | | | | | |
| Apparatus: | | | | | | | | | |
| Number | 2 | 8 | 47 | 165 | 12 | 5 | 39 | 32 | 40 |
| Length, yards | 600 | 800 | | | | | | | |
| Square yards | | | 11,375 | 103,540 | 3,570 | 1,800 | | | |
| Hooks, baits, or snoods | | | | | | | 39 | 10,080 | 2,840 |

*Fisheries of Georgia, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Cast nets | Otter trawls, shrimp | Pots | | Dredges, oyster | Tongs, oyster | Grabs | By hand, oysters | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | | Crab | Fish | | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | 89 | | | | | | | 139 |
| On boats and shore: | | | | | | | | | |
| Regular | | 210 | 18 | | 6 | 90 | 20 | 26 | 381 |
| Casual | 10 | | | 20 | | | | | 468 |
| Total | 10 | 299 | 18 | 20 | 6 | 90 | 20 | 26 | 988 |
| Vessels, motor | | 44 | | | | | | | 46 |
| Net tonnage | | 313 | | | | | | | 421 |
| Boats: | | | | | | | | | |
| Motor | | 105 | | | 3 | | | | 122 |
| Other | 4 | | 18 | 10 | | 90 | 20 | 26 | 423 |
| Accessory boats | | | | | | | | | 6 |
| Apparatus: | | | | | | | | | |
| Number | 10 | 149 | 48 | 50 | 3 | 90 | 20 | | |
| Yards at mouth | | 3,248 | | | 3 | | | | |

CATCH: By gear

| Species | Purse seines, menhaden | | Haul seines | | Gill nets | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Anchor | | Drift | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Hickory shad | | | | | 500 | $90 | 10,000 | $952 |
| Menhaden | 18,751,500 | $63,859 | | | | | | |
| Shad | | | | | 28,500 | 5,130 | 187,500 | 31,030 |
| Squeteagues or "sea trout", spotted | | | | | 10,000 | 800 | | |
| Sturgeon | | | | | | | 11,600 | 928 |
| Terrapin, diamond back | | | 11,900 | $1,280 | | | | |
| Total | 18,751,500 | 63,859 | 11,900 | 1,280 | 39,000 | 6,020 | 209,100 | 32,910 |

| Species | Gill nets—Continued | | | | Lines | | | |
|---|---|---|---|---|---|---|---|---|
| | Runaround | | Stake | | Hand | | Trot with baits or snoods | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Croaker | 7,000 | $280 | | | | | | |
| Drum, red or redfish | 2,500 | 125 | | | | | | |
| Flounders | 3,300 | 96 | | | | | | |
| King whiting or "kingfish" | 10,000 | 320 | | | 2,000 | $60 | | |
| Mullet | 49,000 | 2,200 | | | | | | |
| Sea bass | 3,000 | 90 | | | 20,000 | 600 | | |
| Shad | | | 16,000 | $2,240 | | | | |
| Spot | 13,000 | 460 | | | | | | |
| Squeteagues or "sea trout", spotted | 32,000 | 2,560 | | | 6,000 | 480 | | |
| Crabs, hard | | | | | | | 355,500 | $5,332 |
| Total | 119,800 | 6,131 | 16,000 | 2,240 | 28,000 | 1,140 | 355,500 | 5,332 |

| Species | Lines—Con. | | Cast nets | | Otter trawls, shrimp | | Pots | |
|---|---|---|---|---|---|---|---|---|
| | Trot with hooks | | | | | | Crab | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 15,000 | $900 | | | | | | |
| Mullet | | | 10,000 | $400 | | | | |
| Squeteagues or "sea trout", spotted | | | 8,000 | 640 | | | | |
| Crabs, hard | | | | | | | 128,000 | $1,920 |
| Shrimp | | | | | 6,842,900 | $203,127 | | |
| Total | 15,000 | 900 | 18,000 | 1,040 | 6,842,900 | 203,127 | 128,000 | 1,920 |

*Fisheries of Georgia, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Pots—Contd. Fish | | Dredges | | Tongs | | Grabs | | By hand | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 37,500 | $2,250 | | | | | | | | |
| Oysters: | | | | | | | | | | |
| Market, private, spring | | | 33,500 | $2,606 | 116,100 | $7,661 | 143,800 | $4,424 | 34,200 | $1,897 |
| Market, private, fall | | | 25,300 | 1,975 | 202,100 | 12,084 | | | 13,700 | 714 |
| Total | 37,500 | 2,250 | 58,800 | 4,581 | 318,200 | 19,745 | 143,800 | 4,424 | 47,900 | 2,611 |

OPERATING UNITS: BY COUNTIES

| Item | Bryan | Bullock | Camden | Charlton | Chatham | Glynn | Liberty | McIntosh | Screven | Tattnall | Wayne |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | | | |
| On vessels | | | 60 | | 21 | 56 | | 2 | | | |
| On boats and shore: | | | | | | | | | | | |
| Regular | | | 34 | | 136 | 116 | 12 | 83 | | | |
| Casual | 76 | 12 | 28 | 10 | 156 | 82 | | 36 | 4 | 24 | 40 |
| Total | 76 | 12 | 122 | 10 | 313 | 254 | 12 | 121 | 4 | 24 | 40 |
| Vessels, motor | | | 7 | | 10 | 28 | | 1 | | | |
| Net tonnage | | | 154 | | 79 | 180 | | 8 | | | |
| Boats: | | | | | | | | | | | |
| Motor | | | 17 | | 22 | 50 | 1 | 32 | | | |
| Other | 38 | 6 | 14 | 5 | 208 | 63 | 10 | 43 | 4 | 12 | 20 |
| Accessory boats | | | 6 | | | | | | | | |
| Apparatus: | | | | | | | | | | | |
| Purse seines, menhaden | | | 2 | | | | | | | | |
| Length, yards | | | 600 | | | | | | | | |
| Haul seines | | | | | 2 | 6 | | | | | |
| Length, yards | | | | | 140 | 660 | | | | | |
| Gill nets: | | | | | | | | | | | |
| Anchor | | | | | 40 | 3 | | | 4 | | |
| Square yards | | | | | 10,000 | 375 | | | 1,000 | | |
| Drift | 38 | 6 | 9 | 5 | 35 | 22 | | 18 | | 12 | 20 |
| Square yards | 34,700 | 3,360 | 3,600 | 2,000 | 28,000 | 9,760 | | 14,440 | | 2,880 | 4,800 |
| Runaround | | | | | 4 | 8 | | | | | |
| Square yards | | | | | 800 | 2,770 | | | | | |
| Stake | | | 5 | | | | | | | | |
| Square yards | | | 1,800 | | | | | | | | |
| Lines: | | | | | | | | | | | |
| Hand | | | | | 3 | 36 | | | | | |
| Hooks | | | | | 3 | 36 | | | | | |
| Trot with baits or snoods | | | | | 24 | 8 | | | | | |
| Baits or snoods | | | | | 7,200 | 2,880 | | | | | |
| Trot with hooks | | | | | 40 | | | | | | |
| Hooks | | | | | 2,840 | | | | | | |
| Cast nets | | | | | 10 | | | | | | |
| Otter trawls, shrimp | | | 22 | | 27 | 70 | | 30 | | | |
| Yards at mouth | | | 462 | | 570 | 1,613 | | 603 | | | |
| Pots: | | | | | | | | | | | |
| Crab | | | | | 12 | 36 | | | | | |
| Fish | | | | | | | | 50 | | | |
| Dredges, oyster | | | | | | 2 | 1 | | | | |
| Yards at mouth | | | | | | 2 | 1 | | | | |
| Tongs, oyster | | | | | 71 | 4 | 10 | 5 | | | |
| Grabs | | | | | | | | 20 | | | |

*Fisheries of Georgia, 1934*—Continued

CATCH: BY COUNTIES

| Species | Bryan | | Bullock | | Camden | | Charlton | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Hickory shad | 1,000 | $100 | | | | | | |
| Menhaden | | | | | 18,751,500 | $63,859 | | |
| Shad | 29,000 | 5,220 | 2,500 | $270 | 50,000 | 7,000 | 25,000 | $3,500 |
| Shrimp | | | | | 1,044,000 | 31,320 | | |
| Total | 30,000 | 5,320 | 2,500 | 270 | 19,845,500 | 102,179 | 25,000 | 3,500 |

| Species | Chatham | | Glynn | | Liberty | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 15,000 | $900 | | | | |
| Croaker | | | 7,000 | $280 | | |
| Drum, red or redfish | | | 2,500 | 125 | | |
| Flounders | 300 | 6 | 3,000 | 90 | | |
| Hickory shad | | | 2,500 | 450 | | |
| King whiting or "kingfish" | 2,000 | 80 | 10,000 | 300 | | |
| Mullet | 35,000 | 1,400 | 24,000 | 1,200 | | |
| Sea bass | 23,000 | 690 | | | | |
| Shad | 66,000 | 11,880 | 21,000 | 3,600 | | |
| Spot | 4,000 | 100 | 9,000 | 360 | | |
| Squeteagues or "sea trout", spotted | 38,000 | 3,040 | 18,000 | 1,440 | | |
| Sturgeon | 1,000 | 80 | | | | |
| Crabs, hard | 274,500 | 4,117 | 209,000 | 3,135 | | |
| Shrimp | 2,175,200 | 63,096 | 2,030,200 | 60,906 | | |
| Oysters: | | | | | | |
| Market, private, spring | 111,600 | 6,606 | 27,500 | 2,146 | 34,800 | $2,704 |
| Market, private, fall | 187,400 | 10,591 | 15,300 | 1,190 | 38,400 | 2,992 |
| Terrapin, diamond back | 2,700 | 360 | 9,200 | 920 | | |
| Total | 2,935,700 | 102,946 | 2,388,200 | 76,142 | 73,200 | 5,696 |

| Species | McIntosh | | Screven | | Tattnall | | Wayne | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 37,500 | $2,250 | | | | | | |
| Hickory shad | 2,000 | 200 | | | 1,000 | $180 | 4,000 | $112 |
| Shad | 17,000 | 3,060 | 1,500 | $270 | 7,000 | 1,260 | 13,000 | 2,340 |
| Sturgeon | 10,600 | 848 | | | | | | |
| Shrimp | 1,593,500 | 47,805 | | | | | | |
| Oysters, market, private, spring | 153,700 | 5,132 | | | | | | |
| Total | 1,814,300 | 59,295 | 1,500 | 270 | 8,000 | 1,440 | 17,000 | 2,452 |

## FLORIDA

*Fisheries of Florida, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines | | Haul seines | | Gill nets | | | | Trammel nets |
|---|---|---|---|---|---|---|---|---|---|
| | Menhaden | Other | Common | Long | Anchor | Drift | Run-around | Stake | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | |
| On vessels | 120 | 9 | | | | | | | |
| On boats and shore: | | | | | | | | | |
| Regular | | | 479 | 201 | 8 | 101 | 2,367 | | 311 |
| Casual | | | 112 | 6 | 12 | 61 | 248 | 12 | 4 |
| Total | 120 | 9 | 591 | 207 | 20 | 162 | 2,615 | 12 | 315 |
| Vessels, motor | 5 | 1 | | | | | | | |
| Net tonnage | 293 | 11 | | | | | | | |
| Boats: | | | | | | | | | |
| Motor | | | 99 | 72 | 9 | 55 | 1,115 | | 117 |
| Other | | | 67 | 108 | 6 | 61 | 1,780 | 6 | 138 |
| Accessory boats | 9 | 2 | | | | | | | |
| Apparatus: | | | | | | | | | |
| Number | 5 | 1 | 116 | 75 | 26 | 105 | 2,259 | 6 | 181 |
| Length, yards | 1,475 | 350 | 39,455 | 50,300 | | | | | |
| Square yards | | | | | 38,600 | 185,790 | 1,820,749 | 2,340 | 129,839 |

*Fisheries of Florida, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Lines | | | | Pound nets | Stop nets | Dip nets | | Cast nets |
|---|---|---|---|---|---|---|---|---|---|
| | Hand | Troll | Trot with baits or snoods | Trot with hooks | | | Common | Drop | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 422 | | | | | | | | |
| On boats and shore: | | | | | | | | | |
| Regular | 641 | 792 | 42 | 93 | 20 | 62 | 44 | 12 | 12 |
| Casual | 486 | 188 | | 5 | | | 13 | 12 | 6 |
| Total | 1,549 | 980 | 42 | 98 | 20 | 62 | 57 | 24 | 18 |
| Vessels, motor | 56 | | | | | | | | |
| Net tonnage | 1,911 | | | | | | | | |
| Boats: | | | | | | | | | |
| Motor | 319 | 480 | 19 | 26 | 9 | 16 | 31 | 6 | 3 |
| Other | 437 | 30 | 23 | 69 | 7 | 36 | 35 | | 3 |
| Accessory boats | 7 | | | | | | | | |
| Apparatus: | | | | | | | | | |
| Number | 1,549 | 1,029 | 30 | 106 | 17 | 9 | 57 | 24 | 18 |
| Square yards | | | | | | 15,670 | | | |
| Hooks, baits, or snoods | 2,155 | 1,137 | 6,740 | 42,360 | | | | | |

| Item | Otter trawls | | Pots | | | | Spears | Dredges | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fish | Shrimp | Crab | Eel | Fish | Sea crawfish | | Clam | Oyster | Scallop |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 8 | 308 | | | | | | | 10 | 14 |
| On boats and shore: | | | | | | | | | | |
| Regular | | 248 | 25 | 2 | 62 | 56 | 5 | 12 | | 4 |
| Casual | | | 5 | | 9 | | 26 | | | |
| Total | 8 | 556 | 30 | 2 | 71 | 56 | 31 | 12 | 10 | 18 |
| Vessels, motor | 2 | 140 | | | | | | | 4 | 2 |
| Net tonnage | 33 | 1,124 | | | | | | | 33 | 37 |
| Boats: | | | | | | | | | | |
| Motor | | 124 | 18 | 2 | 21 | 28 | | | | 4 |
| Other | | | 14 | | 45 | 10 | | | | |
| Apparatus: | | | | | | | | | | |
| Number | 2 | 264 | 1,648 | 40 | 3,020 | 958 | 31 | 1 | 4 | 6 |
| Yards at mouth | 63 | 5,324 | | | | | | | 4 | 11 |

| Item | Tongs, oyster | Rakes, other than for oysters | Forks | Grabs | Coquina scoops | Hooks, sponge | Diving outfits | By hand | | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Oysters | Other | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | | | 8 | | | 870 |
| On boats and shore: | | | | | | | | | | |
| Regular | 341 | | 24 | 28 | | 482 | 393 | 63 | 3 | 5,461 |
| Casual | 50 | 2 | 28 | | 2 | | | | 163 | 1,177 |
| Total | 391 | 2 | 52 | 28 | 2 | 482 | 401 | 63 | 166 | 7,508 |
| Vessels, motor | | | | | | | 1 | | | 202 |
| Net tonnage | | | | | | | 5 | | | 3,316 |
| Boats: | | | | | | | | | | |
| Motor | 119 | | | 14 | | | 52 | | | 2,064 |
| Other | 140 | 2 | 10 | 7 | | 241 | | 34 | | 2,966 |
| Accessory boats | | | | | | | | | | 18 |
| Apparatus, number | 391 | 2 | 52 | 28 | 1 | 241 | 53 | | | |

*Fisheries of Florida, 1934*—Continued

CATCH: BY GEAR

| Species | Purse seines | | | | Haul seines | | | |
|---|---|---|---|---|---|---|---|---|
| | Menhaden | | Other | | Common | | Long | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | | | | | 206,000 | $1,030 |
| Black bass | | | | | 11,300 | $904 | 239,800 | 14,108 |
| Bluefish | | | | | 214,100 | 6,471 | 6,600 | 330 |
| Blue runner or hardtail | | | | | 17,900 | 225 | | |
| Cabio or crab eater | | | | | 100 | 2 | | |
| Catfish and bullheads | | | | | 739,000 | 25,886 | 1,362,000 | 42,052 |
| Cigarfish | | | | | 4,500 | 90 | | |
| Crappie | | | | | 37,000 | 1,260 | 285,100 | 7,819 |
| Crevalle | | | | | 11,100 | 167 | 27,400 | 274 |
| Croaker | | | | | 6,900 | 179 | 23,000 | 460 |
| Drum: | | | | | | | | |
| Black | | | | | 40,000 | 953 | 15,000 | 300 |
| Red or redfish | | | | | 93,600 | 2,361 | 3,300 | 131 |
| Flounders | | | | | 12,000 | 525 | | |
| Groupers | | | | | | | 24,000 | 720 |
| Hickory shad | | | | | | | 39,300 | 244 |
| Kingfish or "king mackerel" | | | 60,000 | $2,400 | 1,300 | 52 | | |
| King whiting or "kingfish" | | | | | 52,200 | 1,393 | | |
| Menhaden | 38,966,400 | $121,358 | | | 17,000 | 285 | | |
| Mojarro | | | | | 1,500 | 30 | | |
| Mullet | | | 200,000 | 4,000 | 2,948,800 | 78,384 | 591,400 | 9,046 |
| Muttonfish | | | | | | | 53,000 | 1,160 |
| Permit | | | | | 1,300 | 26 | | |
| Pigfish | | | | | 8,200 | 167 | 28,000 | 560 |
| Pompano | | | | | 31,600 | 5,025 | 54,000 | 6,600 |
| Shad | | | | | 244,800 | 15,816 | 295,500 | 20,622 |
| Sheepshead | | | | | 27,900 | 564 | 28,000 | 560 |
| Snapper, mangrove | | | | | 23,900 | 711 | 53,700 | 1,611 |
| Snook or sergeantfish | | | | | 37,100 | 770 | 46,900 | 1,407 |
| Spanish mackerel | | | | | 533,600 | 19,644 | 400 | 20 |
| Spot | | | | | 6,900 | 198 | 23,000 | 460 |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | | | | | 209,800 | 11,193 | 16,600 | 996 |
| White | | | | | 10,100 | 185 | | |
| Sunfish | | | | | 25,000 | 840 | 407,000 | 10,773 |
| Tenpounder | | | | | 27,500 | 482 | | |
| White perch | | | | | 18,200 | 728 | | |
| Turtles: | | | | | | | | |
| Green | | | | | 400 | 4 | | |
| Soft shell | | | | | | | 55,000 | 674 |
| Total | 38,966,400 | 121,358 | 260,000 | 6,400 | 5,414,600 | 175,520 | 3,884,000 | 121,957 |

| Species | Gill nets | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Anchor | | Drift | | Runaround | | Stake | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | | | 9,000 | $540 | 1,231,100 | $65,906 | | |
| Blue runner or hardtail | | | 1,200 | 24 | 156,300 | 2,701 | | |
| Catfish and bullheads | | | | | 8,200 | 258 | | |
| Crevalle | | | | | 72,200 | 1,120 | | |
| Croaker | | | | | 8,000 | 160 | | |
| Drum: | | | | | | | | |
| Black | | | | | 39,800 | 792 | | |
| Red or redfish | | | | | 696,800 | 16,462 | | |
| Flounders | | | | | 23,200 | 756 | | |
| Groupers | | | | | 53,000 | 1,510 | | |
| Hickory shad | | | 3,600 | 108 | | | | |
| Kingfish or "king mackerel" | | | | | 2,000 | 160 | | |
| King whiting or "kingfish" | | | 4,800 | 159 | 77,600 | 1,792 | | |
| Mojarro | | | | | 3,300 | 75 | | |
| Mullet | | | | | 19,176,700 | 520,318 | | |
| Muttonfish | | | | | 56,000 | 1,960 | | |
| Pigfish | | | | | 53,400 | 992 | | |
| Pinfish or sailors choice | | | | | 31,000 | 620 | | |
| Pompano | | | | | 170,600 | 30,879 | | |
| Sawfish | | | | | 17,500 | 35 | | |
| Sea bass | | | | | 7,000 | 260 | | |
| Sea catfish | | | | | 105,000 | 210 | | |
| Shad | 20,000 | $2,500 | 214,900 | 26,788 | | | 7,000 | $1,260 |
| Sharks | 3,200,000 | 8,500 | | | 17,500 | 35 | | |
| Sheepshead | | | | | 413,600 | 9,156 | | |

*Fisheries of Florida, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Gill nets | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Anchor | | Drift | | Runaround | | Stake | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Skates | | | | | 175,000 | $350 | | |
| Snapper: | | | | | | | | |
| Mangrove | | | | | 74,300 | 2,137 | | |
| Red | | | | | 69,200 | 4,116 | | |
| Snook or sergeantfish | | | | | 228,900 | 4,674 | | |
| Spanish mackerel | | | 81,300 | $3,252 | 5,927,200 | 238,964 | | |
| Spot | | | | | 54,500 | 1,015 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | | | 8,100 | 486 | 2,112,900 | 111,682 | | |
| White | | | | | 300 | 9 | | |
| Sturgeon | | | 1,000 | 60 | | | | |
| Turtles, green | 3,000 | $180 | | | | | | |
| Total | 3,223,000 | 11,180 | 323,900 | 31,417 | 31,062,100 | 1,019,104 | 7,000 | $1,260 |

| Species | Trammel nets | | Lines | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Hand | | Troll | | Trot with baits or snoods | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Amberjack | | | 2,500 | $55 | 1,500 | $25 | | |
| Black bass | | | 26,800 | 1,608 | | | | |
| Bluefish | | | 156,600 | 11,058 | 303,500 | 15,590 | | |
| Blue runner or hardtail | | | 700 | 24 | | | | |
| Cabio or crab eater | | | 6,800 | 164 | | | | |
| Croaker | | | | | 500 | 15 | | |
| Dolphin | | | | | 8,000 | 240 | | |
| Drum: | | | | | | | | |
| Black | | | 5,200 | 118 | | | | |
| Red or redfish | 26,400 | $717 | 169,300 | 4,087 | | | | |
| Flounders | 300 | 11 | | | | | | |
| Groupers | | | 3,245,600 | 76,344 | | | | |
| Grunts | | | 20,300 | 538 | | | | |
| Hogfish | | | 4,000 | 120 | | | | |
| Jewfish | | | 12,400 | 388 | | | | |
| Kingfish or "king mackerel" | | | | | 2,574,500 | 113,473 | | |
| Mackerel | | | 200 | 9 | | | | |
| Mullet | 588,200 | 16,709 | | | | | | |
| Muttonfish | | | 77,900 | 4,999 | | | | |
| Pompano | 172,900 | 33,635 | 4,200 | 1,155 | | | | |
| Porgies | | | 28,300 | 630 | | | | |
| Sea bass | | | 44,000 | 1,722 | 1,000 | 40 | | |
| Sheepshead | 7,500 | 199 | 115,400 | 2,534 | | | | |
| Snapper: | | | | | | | | |
| Mangrove | 300 | 9 | 64,900 | 2,031 | | | | |
| Red | | | 3,987,600 | 219,275 | | | | |
| Snook or sergeantfish | | | 91,800 | 2,529 | | | | |
| Spanish mackerel | | | 10,000 | 440 | 149,400 | 8,175 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 158,200 | 8,190 | 521,200 | 27,850 | | | | |
| White | 1,100 | 30 | 2,500 | 63 | | | | |
| Tripletail | | | 600 | 12 | | | | |
| Tuna or "horse mackerel" | | | 1,300 | 41 | 3,000 | 120 | | |
| Wahoo | | | | | 2,000 | 60 | | |
| Yellowtail | | | 81,400 | 4,677 | | | | |
| Crabs, hard | | | | | | | 91,900 | $2,075 |
| Total | 954,900 | 59,500 | 8,681,500 | 362,471 | 3,043,400 | 137,738 | 91,900 | 2,076 |

*Fisheries of Florida, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Lines—Con. | | Pound nets | | Stop nets | | Dip nets | |
|---|---|---|---|---|---|---|---|---|
| | Trot with hooks | | | | | | Common | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | | | 8,900 | $25 | | | | |
| Bluefish | | | 12,000 | 720 | 1,000 | $60 | | |
| Blue runner or hardtail | | | 5,000 | 100 | | | | |
| Cabio or crab eater | | | 500 | 15 | | | | |
| Catfish and bullheads | 354,300 | $10,476 | 136,400 | 4,769 | | | | |
| Crevalle | | | | | 300 | 4 | | |
| Croaker | | | | | 4,000 | 80 | | |
| Drum: | | | | | | | | |
| Black | | | | | 100 | 2 | | |
| Red or redfish | | | 1,600 | 49 | 25,900 | 470 | | |
| Eels | | | 200 | 7 | | | | |
| Flounders | | | | | 6,400 | 192 | | |
| Groupers | | | 800 | 16 | | | | |
| Jewfish | | | 1,000 | 20 | | | | |
| Kingfish or "king mackerel" | | | 300 | 12 | | | | |
| King whiting or "kingfish" | | | | | 4,000 | 80 | | |
| Mojarro | | | | | 9,300 | 186 | | |
| Mullet | | | | | 428,200 | 11,680 | | |
| Permit | | | | | 400 | 8 | | |
| Pigfish | | | | | 5,200 | 104 | | |
| Pompano | | | | | 4,200 | 840 | | |
| Porgies | | | 200 | 4 | | | | |
| Sheepshead | | | 500 | 15 | 13,000 | 238 | | |
| Snapper, mangrove | | | 500 | 15 | 2,100 | 53 | | |
| Snook or sergeantfish | | | | | 9,100 | 166 | | |
| Spanish mackerel | | | 32,300 | 1,292 | | | | |
| Spot | | | | | 700 | 14 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | | | 7,200 | 390 | 49,200 | 2,488 | | |
| White | | | | | 300 | 9 | | |
| Sunfish | | | 14,600 | 438 | | | | |
| Crabs, king | | | | | | | 500,000 | $600 |
| Sea crawfish or "spiny lobster" | | | | | | | 131,100 | 5,244 |
| Turtles: | | | | | | | | |
| Green | | | 1,200 | 60 | | | | |
| Soft shell | | | 200 | 3 | | | | |
| Total | 354,300 | 10,476 | 223,400 | 7,950 | 563,400 | 16,674 | 631,100 | 5,844 |

| Species | Dip nets—Con. | | Cast nets | | Otter trawls | | | |
|---|---|---|---|---|---|---|---|---|
| | Drop | | | | Fish | | Shrimp | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Croaker | | | | | 10,000 | $300 | | |
| Flounders | | | | | 11,200 | 606 | 2,500 | $50 |
| King whiting or "kingfish" | | | | | 70,000 | 2,100 | 116,000 | 2,320 |
| Mojarro | | | 5,000 | $100 | | | | |
| Mullet | | | 33,000 | 990 | | | | |
| Porgies | | | | | 10,000 | 300 | | |
| Squeteagues or "sea trout", gray | | | | | 10,000 | 500 | | |
| Crabs, hard | 5,600 | $120 | | | | | | |
| Sea crawfish or "spiny lobster" | 100,000 | 4,000 | | | | | | |
| Shrimp | | | | | | | 16,292,200 | 497,870 |
| Total | 105,600 | 4,120 | 38,000 | 1,090 | 111,200 | 3,806 | 16,410,700 | 500,240 |

*Fisheries of Florida, 1934*—Continued

CATCH: By gear—Continued

| Species | Pots | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Crab | | Eel | | Fish | | Sea crawfish | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Black bass | | | | | 145,000 | $8,575 | | |
| Catfish and bullheads | | | | | 254,300 | 10,036 | | |
| Crappie | | | | | 140,200 | 2,877 | | |
| Eels | | | 18,200 | $546 | | | | |
| Groupers | | | | | 18,000 | 900 | | |
| Grunts | | | | | 20,000 | 600 | | |
| Hogfish | | | | | 2,000 | 60 | | |
| Muttonfish | | | | | 12,000 | 720 | | |
| Snapper: | | | | | | | | |
| Mangrove | | | | | 9,000 | 450 | | |
| Red | | | | | 11,000 | 880 | | |
| Snook or sergeantfish | | | | | 8,000 | 400 | | |
| Sunfish | | | | | 70,900 | 1,493 | | |
| Turbot | | | | | 1,500 | 45 | | |
| Crabs: | | | | | | | | |
| Hard | 85,300 | $1,279 | | | | | | |
| Stone | 80,600 | 5,737 | | | | | | |
| Sea crawfish or "spiny lobster" | | | | | | | 89,300 | $5,759 |
| Total | 165,900 | 7,016 | 18,200 | 546 | 691,900 | 27,036 | 89,300 | 5,759 |

| Species | Spears | | Dredges | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Clam | | Oyster | | Scallop | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders | 19,200 | $1,002 | | | | | | |
| Clams, hard, public | | | 399,800 | $19,994 | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | 47,600 | $1,680 | | |
| Market, private, spring | | | | | 17,200 | 1,516 | | |
| Market, private, fall | | | | | 6,400 | 572 | | |
| Scallops: | | | | | | | | |
| Bay | | | | | | | 16,000 | $1,000 |
| Sea | | | | | | | 120,200 | 17,891 |
| Total | 19,200 | 1,002 | 399,800 | 19,994 | 71,200 | 3,768 | 136,200 | 18,891 |

| Species | Tongs | | Rakes | | Forks | | Grabs | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Sea crawfish or "spiny lobster" | | | | | | | 30,900 | $2,163 |
| Clams, hard, public | | | 500 | $50 | 134,200 | $5,988 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 779,800 | $38,892 | | | | | | |
| Market, public, fall | 509,700 | 30,573 | | | | | | |
| Market, private, spring | 73,100 | 5,444 | | | | | | |
| Market, private, fall | 39,100 | 3,028 | | | | | | |
| Total | 1,401,700 | 77,937 | 500 | 50 | 134,200 | 5,988 | 30,900 | 2,163 |

| Species | Coquina scoops | | Hooks, sponge | | Diving outfits | | By hand | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Oysters | | Other | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Clams: | | | | | | | | | | |
| Coquina | 5,800 | $975 | | | | | | | | |
| Hard, public | | | | | | | | | 500 | $50 |
| Conchs | | | 2,500 | $75 | | | | | | |
| Oysters: | | | | | | | | | | |
| Market, private, spring | | | | | | | 271,500 | $9,696 | | |
| Market, private, fall | | | | | | | 291,600 | 10,230 | | |
| Scallops, bay | | | | | | | | | 58,100 | 5,596 |
| Turtles, soft shell | | | | | | | | | 6,000 | 120 |
| Sponges: | | | | | | | | | | |
| Grass | | | 45,400 | 24,699 | | | | | | |
| Sheepswool | | | 129,900 | 190,756 | 328,600 | $529,501 | | | | |
| Velvet | | | 200 | 110 | | | | | | |
| Wire | | | 300 | 88 | 14,100 | 7,806 | | | | |
| Yellow | | | 62,100 | 34,541 | 74,700 | 50,149 | | | | |
| Total | 5,800 | 975 | 240,400 | 250,269 | 417,400 | 587,456 | 563,100 | 19,926 | 64,600 | 5,766 |

*Fisheries of Florida, 1934*—Continued

OPERATING UNITS: BY COUNTIES

| Item | Bay | Brevard | Broward | Charlotte | Citrus | Clay | Collier | Dade |
|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | |
| On vessels | 51 | 5 | | | | | | 14 |
| On boats and shore: | | | | | | | | |
| Regular | 194 | 166 | 22 | 137 | 130 | 32 | 234 | 423 |
| Casual | 34 | 28 | 57 | 35 | 17 | | 22 | 100 |
| Total | 279 | 199 | 79 | 172 | 147 | 32 | 256 | 537 |
| Vessels, motor | 8 | 1 | | | | | | 2 |
| Net tonnage | 81 | 19 | | | | | | 26 |
| Boats: | | | | | | | | |
| Motor | 40 | 69 | 38 | 55 | 58 | 10 | 81 | 276 |
| Other | 57 | 94 | 4 | 135 | 122 | 18 | 176 | 82 |
| Accessory boats | | | | | | | | 2 |
| Apparatus: | | | | | | | | |
| Purse seines: | | | | | | | | |
| Other than menhaden | | | | | | | | 1 |
| Length, yards | | | | | | | | 350 |
| Haul seines: | | | | | | | | |
| Common | 14 | | | 5 | | | 5 | |
| Length, yards | 5,300 | | | 2,240 | | | 1,850 | |
| Long | | | | | | 8 | | |
| Length, yards | | | | | | 6,200 | | |
| Gill nets: | | | | | | | | |
| Anchor | | 8 | | | | | | |
| Square yards | | 8,000 | | | | | | |
| Runaround | 8 | 85 | 2 | 70 | 104 | | 136 | 147 |
| Square yards | 5,850 | 73,800 | 600 | 78,360 | 64,500 | | 144,765 | 35,740 |
| Trammel nets | 2 | | | 6 | | | 20 | |
| Square yards | 1,100 | | | 4,900 | | | 23,100 | |
| Lines: | | | | | | | | |
| Hand | 111 | 52 | 50 | 47 | 25 | | 72 | 155 |
| Hooks | 214 | 52 | 50 | 47 | 25 | | 72 | 165 |
| Troll | | 12 | 40 | 16 | 2 | | 52 | 250 |
| Hooks | | 12 | 40 | 16 | 2 | | 52 | 250 |
| Trot with hooks | | | | | | 16 | | |
| Hooks | | | | | | 9,600 | | |
| Stop nets | | | | 7 | | | | |
| Square yards | | | | 11,070 | | | | |
| Dip nets, drop | | | | | | | | 12 |
| Otter trawls: | | | | | | | | |
| Shrimp | | 16 | | | | | | 1 |
| Yards at mouth | | 323 | | | | | | 23 |
| Pots: | | | | | | | | |
| Crab | | 483 | | | | | | 400 |
| Fish | | | | | | | | 50 |
| Sea crawfish | | | 350 | | | | | 520 |
| Spears | 7 | | | | | | | |
| Dredges, clam | | | | | | | 1 | |
| Tongs, oyster | 58 | | | | 20 | | | |
| Forks | | | | | | | 18 | |
| Grabs | | | | | | | | 28 |

| Item | Duval | Escambia | Franklin | Glades | Gulf | Hernando | Hillsborough | Indian River |
|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | |
| On vessels | 12 | 236 | 42 | | 56 | | 44 | |
| On boats and shore: | | | | | | | | |
| Regular | 142 | 107 | 411 | 46 | 20 | 8 | 95 | 51 |
| Casual | 48 | 16 | 22 | | 5 | | 28 | 26 |
| Total | 202 | 359 | 475 | 46 | 81 | 8 | 167 | 77 |
| Vessels, motor | 6 | 27 | 12 | | 2 | | 7 | |
| Net tonnage | 40 | 1,561 | 83 | | 93 | | 96 | |
| Boats: | | | | | | | | |
| Motor | 68 | 35 | 181 | 22 | 6 | 2 | 33 | 26 |
| Other | 68 | 14 | 85 | 28 | 5 | 8 | 99 | 50 |
| Apparatus: | | | | | | | | |
| Purse seines, menhaden | | | | | 2 | | | |
| Length, yards | | | | | 560 | | | |
| Haul seines: | | | | | | | | |
| Common | 6 | 6 | 5 | | 2 | | | |
| Length, yards | 6,000 | 2,100 | 2,050 | | 800 | | | |
| Long | | | | 10 | | | | |
| Length, yards | | | | 8,800 | | | | |

*Fisheries of Florida, 1934*—Continued

OPERATING UNITS: BY COUNTIES—Continued

| Item | Duval | Escambia | Franklin | Glades | Gulf | Hernando | Hillsborough | Indian River |
|---|---|---|---|---|---|---|---|---|
| Apparatus—Continued. | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Gill nets: | | | | | | | | |
| Anchor | 6 | | | | | | | |
| Square yards | 21,000 | | | | | | | |
| Drift | 42 | | 2 | | | | | |
| Square yards | 84,000 | | 950 | | | | | |
| Runaround | 4 | 12 | 35 | | 5 | 8 | 77 | 77 |
| Square yards | 5,330 | 72,350 | 21,800 | | 10,350 | 5,230 | 56,535 | 49,600 |
| Trammel nets | | 14 | | | | | 5 | |
| Square yards | | 7,100 | | | | | 4,150 | |
| Lines: | | | | | | | | |
| Hand | 32 | 276 | 40 | | 5 | | 79 | 20 |
| Hooks | 64 | 552 | 74 | | 5 | | 127 | 20 |
| Troll | 5 | | | | | | | |
| Hooks | 5 | | | | | | | |
| Trot with baits or snoods | 12 | | 14 | | | | | |
| Baits or snoods | 1,800 | | 3,950 | | | | | |
| Trot with hooks | 40 | | 7 | | | | | |
| Hooks | 12,000 | | 360 | | | | | |
| Dip nets: | | | | | | | | |
| Common | | | | | | | 4 | |
| Drop | | 12 | | | | | | |
| Cast nets | | | | | | | 12 | |
| Otter trawls: | | | | | | | | |
| Shrimp | 18 | | 64 | | | | | |
| Yards at mouth | 380 | | 768 | | | | | |
| Pots, fish | | | 195 | 1,200 | | | | |
| Spears | | | 11 | | | | | |
| Dredges: | | | | | | | | |
| Oyster | | | 4 | | | | | |
| Yards at mouth | | | 4 | | | | | |
| Scallop | | | | | 4 | | | |
| Yards at mouth | | | | | 5 | | | |
| Tongs, oyster | | | 212 | | | | 2 | |

| Item | Jefferson | Lee | Levy | Manatee | Martin | Monroe | Nassau | Okaloosa |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | | | 129 | |
| On boats and shore: | | | | | | | | |
| Regular | 10 | 307 | 114 | 88 | 96 | 420 | 99 | 115 |
| Casual | 7 | 59 | 23 | 21 | 26 | 15 | 35 | |
| Total | 17 | 366 | 137 | 109 | 122 | 435 | 263 | 115 |
| Vessels, motor | | | | | | | 33 | |
| Net tonnage | | | | | | | 439 | |
| Boats: | | | | | | | | |
| Motor | 3 | 165 | 48 | 39 | 39 | 89 | 30 | 22 |
| Other | 17 | 328 | 126 | 104 | 30 | 172 | 46 | 20 |
| Accessory boats | | | | | | | 9 | |
| Apparatus: | | | | | | | | |
| Purse seines: | | | | | | | | |
| Menhaden | | | | | | | 3 | |
| Length, yards | | | | | | | 915 | |
| Haul seines: | | | | | | | | |
| Common | | 4 | | 12 | | | 3 | 8 |
| Length, yards | | 1,325 | | 2,940 | | | 300 | 3,200 |
| Long | | | | | 10 | | | |
| Length, yards | | | | | 9,600 | | | |
| Gill nets: | | | | | | | | |
| Anchor | | | | | | 12 | | |
| Square yards | | | | | | 9,600 | | |
| Drift | | | | 5 | | | 13 | |
| Square yards | | | | 2,000 | | | 5,840 | |
| Runaround | 10 | 264 | 94 | 76 | 30 | 44 | 4 | 10 |
| Square yards | 5,800 | 206,175 | 49,100 | 69,830 | 36,000 | 135,240 | 1,014 | 5,430 |
| Stake | | | | | | | 6 | |
| Square yards | | | | | | | 2,340 | |
| Trammel nets | | 11 | 38 | 5 | | | | 10 |
| Square yards | | 23,300 | 20,800 | 4,235 | | | | 5,240 |
| Lines: | | | | | | | | |
| Hand | 17 | 124 | 28 | 16 | | 38 | 20 | 22 |
| Hooks | 17 | 124 | 28 | 16 | | 38 | 40 | 44 |
| Troll | | 20 | 52 | 6 | 30 | 86 | | |
| Hooks | | 20 | 52 | 6 | 60 | 86 | | |
| Trot with baits or snoods | | 2 | | | | | | |
| Baits or snoods | | 490 | | | | | | |

*Fisheries of Florida, 1934*—Continued

OPERATING UNITS: By counties—Continued

| Item | Jefferson | Lee | Levy | Manatee | Martin | Monroe | Nassau | Okaloosa |
|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Apparatus—Continued. | | | | | | | | |
| Pound nets | | | 3 | | | | | |
| Dip nets, common | | | | | | 53 | | |
| Otter trawls: | | | | | | | | |
| Fish | | | | | | | 1 | |
| Yards at mouth | | | | | | | 33 | |
| Shrimp | | | | | | | 50 | |
| Yards at mouth | | | | | | | 1,110 | |
| Pots: | | | | | | | | |
| Crab | | | | 75 | | 175 | | |
| Sea crawfish | | | | | | 88 | | |
| Spears | | | | | | | | 4 |
| Tongs, oyster | | | 14 | | | | | |
| Forks | | | | 2 | | | | |
| Coquina scoops | | 1 | | | | | | |
| Hooks, sponge | | | | | | 122 | | |

| Item | Okeechobee | Palm Beach | Pasco | Pinellas | Putnam | St. Johns | St. Lucie |
|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | |
| On vessels | | | | 54 | | 215 | |
| On boats and shore: | | | | | | | |
| Regular | 34 | 240 | 24 | 820 | 164 | 66 | 136 |
| Casual | | 86 | | 162 | | 30 | 36 |
| Total | 34 | 326 | 24 | 1,036 | 164 | 311 | 172 |
| Vessels, motor | | | | 7 | | 92 | |
| Net tonnage | | | | 97 | | 739 | |
| Boats: | | | | | | | |
| Motor | 14 | 129 | 12 | 163 | 64 | 20 | 68 |
| Other | 19 | 69 | 24 | 278 | 93 | 32 | 40 |
| Accessory boats | | | | | | 7 | |
| Apparatus: | | | | | | | |
| Haul seines: | | | | | | | |
| Common | | | | 9 | | | |
| Length, yards | | | | 3,650 | | | |
| Long | 4 | | | | 40 | | |
| Length, yards | 3,600 | | | | 19,700 | | |
| Gill nets: | | | | | | | |
| Drift | | | | 14 | 29 | | |
| Square yards | | | | 35,000 | 58,000 | | |
| Runaround | | 270 | 24 | 194 | | 3 | 117 |
| Square yards | | 68,400 | 15,100 | 282,680 | | 1,500 | 92,875 |
| Trammel nets | | | | 4 | 4 | | |
| Square yards | | | | 2,400 | 1,064 | | |
| Lines: | | | | | | | |
| Hand | | 20 | | 112 | 50 | 34 | |
| Hooks | | 20 | | 173 | 50 | 34 | |
| Troll | | 192 | | 54 | | | 126 |
| Hooks | | 264 | | 60 | | | 126 |
| Trot with hooks | 18 | | | | 25 | | |
| Hooks | 9,000 | | | | 11,400 | | |
| Pound nets | | | | | 14 | | |
| Stop nets | | | | 2 | | | |
| Square yards | | | | 4,600 | | | |
| Cast nets | | 6 | | | | | |
| Otter trawls: | | | | | | | |
| Fish | | | | | | 1 | |
| Yards at mouth | | | | | | 30 | |
| Shrimp | | | | | | 108 | |
| Yards at mouth | | | | | | 2,565 | |
| Pots: | | | | | | | |
| Crab | | | | 515 | | | |
| Eel | | | | | 40 | | |
| Fish | 1,560 | | | | 15 | | |
| Dredges, scallop | | | | | | 2 | |
| Yards at mouth | | | | | | 6 | |
| Tongs, oyster | | | | 8 | | | |
| Forks | | | | 12 | | 20 | |
| Hooks, sponge | | | | 70 | | | |
| Diving outfits | | | | 53 | | | |

*Fisheries of Florida, 1934*—Continued

OPERATING UNITS: By counties—Continued

| Item | Santa Rosa | Sarasota | Semi-nole | Taylor | Volusia | Wakulla | Walton |
|---|---|---|---|---|---|---|---|
| Fisherman: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | 12 | | |
| On boats and shore: | | | | | | | |
| Regular | 9 | 108 | 47 | 136 | 101 | 101 | 8 |
| Casual | 8 | 24 | | 45 | 25 | 137 | |
| Total | 17 | 132 | 47 | 181 | 138 | 238 | 8 |
| Vessels, motor | | | | | 5 | | |
| Net tonnage | | | | | 42 | | |
| Boats: | | | | | | | |
| Motor | 4 | 53 | 6 | 15 | 35 | 44 | 2 |
| Other | 4 | 122 | 27 | 121 | 74 | 171 | 4 |
| Apparatus: | | | | | | | |
| Haul seines: | | | | | | | |
| Common | | 1 | 22 | | 3 | 11 | |
| Length, yards | | 250 | 3,700 | | 450 | 3,300 | |
| Long | | | | | 3 | | |
| Length, yards | | | | | 2,400 | | |
| Gill nets: | | | | | | | |
| Runaround | | 106 | | 40 | 40 | 163 | |
| Square yards | | 101,785 | | 19,600 | 32,000 | 73,410 | |
| Trammel nets | 4 | 4 | | | | 50 | 4 |
| Square yards | 1,750 | 12,000 | | | | 17,500 | 1,200 |
| Lines: | | | | | | | |
| Hand | | 19 | | 61 | 24 | | |
| Hooks | | 19 | | 61 | 24 | | |
| Troll | | 84 | | 2 | | | |
| Hooks | | 84 | | 2 | | | |
| Trot with baits or snoods | | | | | 2 | | |
| Baits or snoods | | | | | 500 | | |
| Otter trawls, shrimp | | | | | 7 | | |
| Yards at mouth | | | | | 155 | | |
| Spears | 9 | | | | | | |
| Tongs, oyster | 8 | 6 | | | 51 | 10 | 2 |
| Rakes, other than for oysters | | | | | 2 | | |
| Hooks, sponge | | | | 49 | | | |

CATCH: By counties

| Species | Bay | | Brevard | | Broward | | Charlotte | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | 169,800 | $5,129 | 75,000 | $3,100 | 10,000 | $800 | 19,900 | $1,194 |
| Blue runner or hardtail | 3,500 | 70 | 300 | 12 | | | 10,600 | 212 |
| Cabio or crab eater | | | | | | | 700 | 21 |
| Cigarfish | 4,500 | 90 | | | | | | |
| Crevalle | | | | | | | 1,200 | 18 |
| Croaker | | | | | 500 | 15 | 6,000 | 120 |
| Drum: | | | | | | | | |
| Black | | | 13,000 | 260 | | | 800 | 14 |
| Red or redfish | 17,700 | 480 | 25,200 | 707 | | | 74,000 | 1,344 |
| Flounders | 2,500 | 105 | | | | | 12,200 | 366 |
| Groupers | 601,300 | 15,131 | 400 | 8 | 5,200 | 520 | 7,000 | 140 |
| Grunts | | | | | | | 1,600 | 32 |
| Jewfish | | | | | | | 1,500 | 30 |
| Kingfish or "king mackerel" | 1,000 | 40 | | | 60,000 | 2,400 | 10,800 | 432 |
| King whiting or "kingfish" | | | 30,000 | 840 | | | 5,000 | 100 |
| Menhaden | 6,000 | 120 | | | | | | |
| Mojarro | | | | | | | 10,300 | 206 |
| Mullet | 1,162,700 | 29,362 | 946,700 | 21,046 | | | 1,404,600 | 37,104 |
| Muttonfish | | | | | 5,000 | 500 | 3,000 | 60 |
| Permit | | | | | | | 1,400 | 28 |
| Pigfish | | | | | | | 9,000 | 180 |
| Pinfish or sailors choice | | | 11,000 | 220 | | | | |
| Pompano | 5,500 | 825 | 8,900 | 1,780 | 5,500 | 1,525 | 32,200 | 6,440 |
| Porgies | 500 | 10 | | | | | | |
| Sharks | | | 200,000 | 1,000 | | | | |
| Sheepshead | 5,600 | 156 | 13,000 | 260 | | | 50,600 | 924 |
| Snapper: | | | | | | | | |
| Mangrove | | | | | | | 9,000 | 242 |
| Red | 494,400 | 26,964 | 500 | 20 | 14,000 | 1,400 | | |
| Snook or sergeantfish | | | 7,500 | 150 | | | 31,400 | 570 |
| Spanish mackerel | 422,600 | 15,170 | 6,000 | 280 | 12,000 | 600 | 79,600 | 3,184 |
| Spot | | | 13,000 | 260 | | | 1,100 | 22 |

*Fisheries of Florida, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Bay | | Brevard | | Broward | | Charlotte | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 86,600 | $4,015 | 217,600 | $11,120 | 200 | $14 | 224,700 | $11,382 |
| White | | | | | | | 2,000 | 60 |
| Tenpounder | 10,000 | 200 | | | | | | |
| Tripletail | | | | | | | | |
| Yellowtail | | | | | | | 600 | 12 |
| Crabs, hard | | | | | | | 4,500 | 90 |
| Sea crawfish or "spiny lobster" | | | 85,300 | 1,279 | | | | |
| Shrimp | | | | | 21,000 | 2,100 | | |
| Oysters: | | | 179,000 | 8,810 | | | | |
| Market, public, spring | 93,000 | 6,200 | | | | | | |
| Market, public, fall | 114,000 | 7,600 | | | | | | |
| Total | 3,201,200 | 113,667 | 1,832,400 | 51,152 | 133,400 | 9,874 | 2,015,300 | 64,527 |

| Species | Citrus | | Clay | | Collier | | Dade | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Amberjack | | | | | | | 500 | $15 |
| Black bass | | | 14,600 | $1,156 | | | | |
| Bluefish | 22,500 | $1,125 | | | 7,700 | $308 | 113,100 | 6,786 |
| Blue runner or hardtail | | | | | 4,800 | 48 | 10,000 | 200 |
| Catfish and bullheads | | | 44,500 | 1,632 | | | | |
| Crappie | | | 300 | 21 | | | | |
| Crevalle | | | | | | | 2,500 | 50 |
| Dolphin | | | | | | | 8,000 | 240 |
| Drum, red or redfish | 81,400 | 2,220 | 2,800 | 112 | 66,200 | 1,554 | | |
| Flounders | 400 | 12 | | | 1,700 | 51 | | |
| Groupers | 1,500 | 45 | | | 6,500 | 130 | 99,000 | 4,950 |
| Grunts | | | | | 1,300 | 26 | 32,000 | 960 |
| Hogfish | | | | | | | 6,000 | 180 |
| Jewfish | | | | | 3,200 | 64 | 5,000 | 200 |
| Kingfish or "king mackerel" | 1,000 | 40 | | | 61,700 | 2,468 | 801,100 | 35,749 |
| Mojarro | | | | | 1,800 | 45 | | |
| Mullet | 1,232,400 | 36,972 | | | 2,548,600 | 63,709 | 602,100 | 16,064 |
| Muttonfish | | | | | 900 | 18 | 61,000 | 4,150 |
| Pigfish | 300 | 24 | | | 7,200 | 165 | | |
| Pompano | 900 | 180 | | | 67,100 | 13,420 | 10,000 | 2,500 |
| Porgies | | | | | | | 1,500 | 45 |
| Sea bass | | | | | | | 1,000 | 40 |
| Shad | | | 200 | 24 | | | | |
| Sheepshead | 48,400 | 1,320 | | | 41,300 | 895 | 10,000 | 300 |
| Snapper: | | | | | | | | |
| Mangrove | 21,000 | 630 | | | 25,100 | 753 | 11,500 | 575 |
| Red | | | | | | | 49,500 | 3,560 |
| Snook or sergeantfish | | | | | 86,200 | 1,960 | 23,000 | 1,300 |
| Spanish mackerel | 5,000 | 200 | | | 203,100 | 10,155 | 1,338,800 | 66,938 |
| Squeteagues or "sea trout", spotted | 132,200 | 6,055 | | | 104,300 | 5,218 | 19,600 | 1,372 |
| Sunfish | | | 10,000 | 490 | | | | |
| Tuna or "horse mackerel" | | | | | | | 3,000 | 120 |
| Turbot | | | | | | | 1,500 | 45 |
| Wahoo | | | | | | | 2,000 | 60 |
| Yellowtail | | | | | 4,100 | 123 | 13,100 | 1,179 |
| Crabs, stone | | | | | | | 13,600 | 2,992 |
| Sea crawfish or "spiny lobster" | | | | | | | 161,800 | 8,326 |
| Shrimp | | | | | | | 80,000 | 2,400 |
| Clams, hard, public | | | | | 496,600 | 24,834 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 20,400 | 912 | | | | | | |
| Market, public, fall | 36,400 | 1,657 | | | | | | |
| Total | 1,603,800 | 51,392 | 72,400 | 3,435 | 3,739,400 | 125,944 | 3,480,200 | 161,296 |

*Fisheries of Florida, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Duval | | Escambia | | Franklin | | Glades | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Black bass | 11,300 | $904 | | | | | 243,000 | $13,967 |
| Bluefish | 3,700 | 185 | 30,100 | $602 | 2,600 | $118 | | |
| Blue runner or hardtail | | | 21,800 | 218 | | | | |
| Cabio or crab eater | | | 100 | 2 | | | | |
| Catfish and bullheads | 400,000 | 14,000 | 4,700 | 164 | 57,300 | 1,774 | 422,900 | 9,524 |
| Crappie | 30,000 | 1,050 | | | | | 156,700 | 3,149 |
| Crevalle | | | 10,200 | 153 | | | | |
| Croaker | | | | | 100 | 3 | | |
| Drum. | | | | | | | | |
| Black | | | 5,900 | 108 | | | | |
| Red or redfish | 500 | 20 | 27,700 | 753 | 29,100 | 774 | | |
| Flounders | | | 300 | 16 | 9,500 | 405 | | |
| Groupers | 200 | 8 | 1,612,000 | 36,999 | 328,300 | 5,988 | | |
| Jewfish | | | 600 | 12 | | | | |
| Kingfish or "king mackerel" | | | 300 | 12 | | | | |
| King whiting or "kingfish" | 66,400 | 1,391 | 200 | 3 | | | | |
| Menhaden | | | | | 4,000 | 60 | | |
| Mullet | 58,700 | 1,761 | 242,500 | 6,062 | 933,700 | 28,011 | | |
| Pompano | 100 | 15 | 26,500 | 3,610 | 400 | 80 | | |
| Porgies | | | 6,200 | 139 | 800 | 16 | | |
| Sea bass | 40,000 | 1,602 | | | | | | |
| Shad | 115,200 | 14,024 | | | | | | |
| Sheepshead | | | 5,300 | 123 | 1,600 | 42 | | |
| Snapper, red | 16,200 | 647 | 2,613,300 | 142,992 | 222,000 | 12,108 | | |
| Spanish mackerel | 27,400 | 2,295 | 397,400 | 13,909 | 14,100 | 564 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 21,700 | 1,460 | 33,500 | 2,440 | 69,000 | 3,406 | | |
| White | | | 2,300 | 31 | | | | |
| Sturgeon | | | | | 1,000 | 60 | | |
| Sunfish | 18,000 | 630 | | | | | 156,700 | 3,149 |
| Tenpounder | | | | | 4,000 | 80 | | |
| Crabs, hard | 40,500 | 1,215 | 5,600 | 120 | 26,600 | 380 | | |
| Shrimp | 857,700 | 24,106 | | | 1,539,500 | 46,185 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | 686,100 | 31,060 | | |
| Market, public, fall | | | | | 314,100 | 17,405 | | |
| Market, private, spring | | | | | 17,200 | 1,516 | | |
| Market, private, fall | | | | | 6,400 | 572 | | |
| Turtles: | | | | | | | | |
| Green | | | 400 | 4 | | | | |
| Soft shell | | | | | | | 4,200 | 63 |
| Total | 1,707,600 | 65,313 | 5,046,900 | 208,472 | 4,267,400 | 150,607 | 983,500 | 29,852 |

| Species | Gulf | | Hernando | | Hillsborough | | Indian River | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | 11,800 | $354 | 4,000 | $200 | 6,000 | $360 | 75,200 | $5,326 |
| Crevalle | | | | | 17,500 | 35 | 8,000 | 160 |
| Drum: | | | | | | | | |
| Black | | | | | | | 16,000 | 320 |
| Red or redfish | | | 14,300 | 390 | 106,300 | 2,898 | 23,800 | 476 |
| Flounders | 800 | 24 | | | 1,100 | 33 | | |
| Groupers | | | | | 160,900 | 2,974 | 8,000 | 160 |
| King whiting or "kingfish" | | | | | | | 11,000 | 220 |
| Menhaden | 9,562,200 | 22,001 | | | | | | |
| Mullet | 318,200 | 9,546 | 100,000 | 3,000 | 775,000 | 23,250 | 688,700 | 16,518 |
| Muttonfish | | | | | | | 5,000 | 100 |
| Pinfish or sailors choice | | | | | | | 16,000 | 320 |
| Pompano | 3,800 | 570 | | | 14,000 | 2,800 | 18,600 | 3,390 |
| Porgies | | | | | 500 | 10 | | |
| Sawfish | | | | | 17,500 | 35 | | |
| Sea bass | | | | | | | 2,000 | 60 |
| Sea catfish | | | | | 105,000 | 210 | | |
| Sharks | | | | | 17,500 | 35 | | |
| Sheepshead | | | 2,500 | 69 | 85,400 | 2,331 | 21,000 | 420 |
| Skates | | | | | 175,000 | 350 | | |
| Snapper: | | | | | | | | |
| Mangrove | | | 2,000 | 60 | 8,000 | 240 | 5,000 | 100 |
| Red | | | | | 221,200 | 12,294 | 1,200 | 36 |
| Snook or sergeantfish | | | | | 52,800 | 960 | 18,000 | 360 |
| Spanish mackerel | 141,000 | 5,640 | | | 1,500 | 60 | 1,400 | 84 |
| Spot | | | | | | | 21,000 | 405 |
| Squeteagues or "sea trout", spotted | 14,800 | 810 | 11,000 | 500 | 170,500 | 9,100 | 294,000 | 17,290 |
| Crabs, king | | | | | 500,000 | 600 | | |
| Oysters: | | | | | | | | |
| Market, private, spring | | | | | 200 | 44 | | |
| Market, private, fall | | | | | 400 | 88 | | |
| Scallops, bay | 16,000 | 1,000 | | | | | | |
| Total | 10,068,600 | 39,945 | 133,800 | 4,219 | 2,436,300 | 58,707 | 1,233,900 | 45,745 |

*Fisheries of Florida, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Jefferson | | Lee | | Levy | | Manatee | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Amberjack | | | 1,500 | $25 | | | | |
| Bluefish | | | 34,700 | 1,720 | 21,500 | $1,284 | 14,500 | $870 |
| Blue runner or hardtail | | | 25,300 | 500 | 11,000 | 220 | 2,500 | 50 |
| Cabio or crab eater | | | 6,100 | 143 | 500 | 15 | | |
| Catfish and bullheads | | | | | 1,000 | 30 | | |
| Croaker | | | | | | | 800 | 16 |
| Drum: | | | | | | | | |
| Black | | | 2,300 | 40 | 300 | 9 | 600 | 12 |
| Red or redfish | 9,300 | $255 | 180,500 | 3,797 | 32,200 | 879 | 50,000 | 1,003 |
| Flounders | | | 5,000 | 150 | 3,600 | 108 | 1,400 | 42 |
| Groupers | | | 12,500 | 250 | 1,800 | 36 | 3,500 | 70 |
| Grunts | | | 4,500 | 90 | | | 200 | 4 |
| Jewfish | | | 100 | 2 | 1,000 | 20 | | |
| Kingfish or "king mackerel" | | | 9,200 | 368 | 69,000 | 2,760 | 3,000 | 120 |
| Mojarro | | | | | | | 2,000 | 40 |
| Mullet | 140,000 | 4,200 | 3,794,300 | 98,452 | 929,100 | 27,873 | 1,100,400 | 30,506 |
| Permit | | | | | | | 300 | 6 |
| Pigfish | | | 15,500 | 310 | | | 1,500 | 30 |
| Pompano | | | 53,000 | 10,610 | 6,000 | 1,200 | 10,400 | 2,080 |
| Porgies | | | | | 1,500 | 30 | 1,000 | 20 |
| Sea bass | | | | | 4,000 | 120 | | |
| Sheepshead | 3,300 | 90 | 128,000 | 2,360 | 12,700 | 351 | 20,000 | 391 |
| Snapper: | | | | | | | | |
| Mangrove | | | 70,300 | 2,109 | 2,400 | 72 | 4,000 | 118 |
| Red | | | | | 1,000 | 60 | | |
| Snook or sergeantfish | | | 53,500 | 1,198 | | | 33,000 | 600 |
| Spanish mackerel | | | 70,300 | 2,957 | 36,300 | 1,452 | 51,500 | 2,060 |
| Spot | | | | | 500 | 15 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 37,500 | 2,100 | 435,500 | 21,918 | 310,800 | 16,320 | 83,100 | 4,536 |
| White | | | 300 | 11 | | | 7,700 | 140 |
| Yellowtail | | | 7,000 | 155 | | | | |
| Crabs: | | | | | | | | |
| Hard | | | 16,800 | 240 | | | | |
| Stone | | | | | | | 1,500 | 125 |
| Clams: | | | | | | | | |
| Coquina | | | 5,800 | 975 | | | | |
| Hard, public | | | | | | | 200 | 20 |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | 1,500 | 85 | | |
| Market, public, fall | | | | | 7,700 | 512 | | |
| Scallops, bay | | | | | | | 4,000 | 375 |
| Turtles: | | | | | | | | |
| Green | | | | | 1,200 | 60 | | |
| Soft shell | | | 6,000 | 120 | | | | |
| Total | 190,100 | 6,645 | 4,938,000 | 148,500 | 1,456,600 | 53,511 | 1,397,100 | 43,234 |

| Species | Martin | | Monroe | | Nassau | | Okaloosa | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Black bass | 2,400 | $240 | | | | | | |
| Bluefish | 249,100 | 14,880 | 3,800 | $304 | 1,000 | $50 | 52,000 | $1,040 |
| Blue runner or hardtail | | | 3,600 | 36 | | | 25,000 | 250 |
| Crevalle | 37,400 | 474 | | | | | | |
| Croaker | 23,000 | 460 | | | 10,000 | 300 | | |
| Drum: | | | | | | | | |
| Black | 20,000 | 400 | | | 6,000 | 150 | 1,100 | 20 |
| Red or redfish | | | 3,300 | 40 | 4,500 | 225 | 5,500 | 150 |
| Flounders | | | | | 12,500 | 550 | 3,000 | 162 |
| Groupers | 24,000 | 720 | 32,000 | 1,570 | | | 192,500 | 4,375 |
| Grunts | | | 700 | 26 | | | | |
| Jewfish | | | 2,000 | 80 | | | | |
| Kingfish or "king mackerel" | 15,000 | 600 | 229,300 | 9,172 | | | | |
| King whiting or "kingfish" | | | | | 96,000 | 2,620 | | |
| Menhaden | | | | | 29,404,200 | 99,357 | 7,000 | 105 |
| Mullet | 709,700 | 11,295 | 229,000 | 4,580 | 8,000 | 200 | 420,000 | 11,550 |
| Muttonfish | 59,000 | 1,280 | 19,200 | 951 | | | | |
| Pigfish | 33,000 | 660 | | | | | | |
| Pompano | 65,000 | 8,800 | 1,200 | 144 | | | 5,000 | 750 |
| Porgies | | | 400 | 12 | 10,000 | 300 | 11,000 | 250 |
| Shad | | | | | 22,000 | 3,960 | | |
| Sharks | | | 3,000,000 | 7,500 | | | | |
| Sheepshead | 34,000 | 680 | 3,400 | 72 | | | 1,600 | 43 |
| Snapper: | | | | | | | | |
| Mangrove | 53,700 | 1,611 | 1,800 | 72 | | | | |
| Red | | | 4,000 | 240 | | | 143,000 | 7,800 |

*Fisheries of Florida, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Martin | | Monroe | | Nassau | | Okaloosa | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Snook or sergeantfish | 53,900 | $1,627 | 1,500 | $15 | | | | |
| Spanish mackerel | 130,400 | 3,920 | 841,100 | 33,644 | | | 400,000 | $14,000 |
| Spot | 28,000 | 560 | | | 5,000 | $100 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Gray | | | | | 10,000 | 500 | | |
| Spotted | 17,100 | 1,021 | 3,500 | 128 | 22,000 | 1,320 | 18,700 | 1,360 |
| Tenpounder | | | | | | | 3,500 | 52 |
| Yellowtail | | | 52,700 | 3,130 | | | | |
| Crabs, stone | | | 13,000 | 520 | | | | |
| Sea crawfish or "spiny lobster" | | | 168,500 | 6,740 | | | | |
| Shrimp | | | | | 3,497,400 | 103,375 | | |
| Conchs | | | 2,500 | 75 | | | | |
| Oysters: | | | | | | | | |
| Market, private, spring | | | | | 168,700 | 7,403 | | |
| Market, private, fall | | | | | 168,700 | 7,403 | | |
| Turtles, green | | | 3,000 | 180 | | | | |
| Sponges: | | | | | | | | |
| Grass | | | 15,000 | 4,681 | | | | |
| Sheepswool | | | 47,100 | 73,783 | | | | |
| Velvet | | | 200 | 110 | | | | |
| Wire | | | 300 | 88 | | | | |
| Yellow | | | 24,600 | 8,840 | | | | |
| Total | 1,554,700 | 49,228 | 4,706,700 | 156,733 | 33,446,000 | 227,813 | 1,288,900 | 41,907 |

| Species | Okeechobee | | Palm Beach | | Pasco | | Pinellas | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Amberjack | | | 2,000 | $40 | | | | |
| Black bass | 35,000 | $1,925 | | | | | | |
| Bluefish | | | 729,000 | 36,470 | 3,000 | $150 | 50,400 | $3,024 |
| Blue runner or hardtail | | | 50,400 | 1,012 | | | 1,800 | 36 |
| Catfish and bullheads | 329,000 | 11,636 | | | | | | |
| Crappie | 160,200 | 3,202 | | | | | | |
| Crevalle | | | 30,000 | 600 | | | 500 | 5 |
| Croaker | | | 7,500 | 150 | | | | |
| Drum: | | | | | | | | |
| Black | | | | | | | 100 | 2 |
| Red or redfish | | | 29,500 | 590 | 14,300 | 390 | 57,600 | 1,098 |
| Flounders | | | | | | | 2,400 | 72 |
| Groupers | | | 44,000 | 1,320 | | | 196,300 | 3,976 |
| Kingfish or "king mackerel" | | | 724,300 | 32,009 | | | 77,800 | 3,112 |
| King whiting or "kingfish" | | | 5,000 | 100 | | | | |
| Mojarro | | | 5,000 | 100 | | | | |
| Mullet | | | 28,000 | 815 | 402,400 | 12,072 | 1,531,800 | 45,954 |
| Muttonfish | | | 42,800 | 1,720 | | | | |
| Pigfish | | | | | | | 1,300 | 29 |
| Pompano | | | 56,900 | 8,575 | 500 | 100 | 15,300 | 3,060 |
| Porgies | | | | | | | 3,100 | 62 |
| Sea bass | | | 5,000 | 200 | | | | |
| Sheepshead | | | 41,000 | 820 | 4,400 | 120 | 27,800 | 575 |
| Snapper: | | | | | | | | |
| Mangrove | | | 800 | 40 | 3,500 | 105 | 5,100 | 153 |
| Red | | | 68,000 | 4,080 | | | 217,300 | 11,850 |
| Snook or sergeantfish | | | 41,800 | 852 | | | 6,500 | 120 |
| Spanish mackerel | | | 1,320,300 | 39,769 | 15,000 | 600 | 581,200 | 23,248 |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | | | 17,200 | 1,034 | 11,800 | 535 | 230,900 | 13,080 |
| White | | | | | | | 900 | 24 |
| Sunfish | 60,900 | 1,218 | | | | | | |
| Tenpounder | | | | | | | 10,000 | 150 |
| Crabs, stone | | | | | | | 52,500 | 2,100 |
| Clams, hard, public | | | | | | | 4,800 | 480 |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | | | 4,200 | 300 |
| Market, public, fall | | | | | | | 5,100 | 360 |
| Scallops, bay | | | | | | | 51,700 | 4,996 |
| Turtles, soft shell | 40,600 | 508 | | | | | | |
| Sponges: | | | | | | | | |
| Grass | | | | | | | 29,400 | 19,503 |
| Sheepswool | | | | | | | 366,000 | 597,574 |
| Wire | | | | | | | 14,100 | 7,806 |
| Yellow | | | | | | | 105,500 | 70,650 |
| Total | 625,700 | 18,489 | 3,248,500 | 130,296 | 454,900 | 14,072 | 3,651,400 | 813,399 |

*Fisheries of Florida, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Putnam | | St. Johns | | St. Lucie | | Santa Rosa | | Sarasota | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 214,900 | $1,055 | | | | | | | | |
| Black bass | 100,600 | 6,043 | | | | | | | | |
| Bluefish | | | 115,100 | $8,978 | 69,200 | $4,152 | | | 17,600 | $1,056 |
| Blue runner or hardtail | | | | | | | | | 7,500 | 150 |
| Catfish and bullheads | 1,074,300 | 36,500 | | | | | | | | |
| Crappie | 89,600 | 3,584 | | | | | | | | |
| Crevalle | | | | | 700 | 10 | | | | |
| Drum: | | | | | | | | | | |
| Black | | | 2,500 | 50 | 1,500 | 30 | | | | |
| Red or redfish | 900 | 35 | 5,000 | 200 | | | 4,400 | $120 | 46,600 | 884 |
| Eels | 18,400 | 553 | | | | | | | | |
| Flounders | | | 3,800 | 236 | | | 8,100 | 485 | 1,800 | 54 |
| Groupers | | | | | 3,000 | 90 | | | 1,500 | 30 |
| Hickory shad | 42,900 | 352 | | | | | | | | |
| Kingfish or "king mackerel" | | | 2,000 | 160 | 375,100 | 18,755 | | | 197,000 | 7,880 |
| King whiting or "kingfish" | | | 66,000 | 1,320 | | | | | | |
| Mackerel | | | 200 | 9 | | | | | | |
| Mullet | 15,900 | 477 | 3,100 | 78 | 426,600 | 8,532 | 135,000 | 4,050 | 963,600 | 26,498 |
| Muttonfish | | | | | 3,000 | 60 | | | | |
| Pigfish | | | | | 3,000 | 45 | | | 4,000 | 80 |
| Pinfish or sailors choice | | | 3,000 | 60 | | | | | | |
| Pompano | | | 100 | 15 | 9,000 | 1,350 | | | 17,000 | 3,400 |
| Porgies | | | | | | | | | 2,000 | 40 |
| Shad | 417,800 | 35,298 | | | | | | | | |
| Sheepshead | | | | | 3,000 | 60 | 700 | 18 | 30,200 | 560 |
| Snapper: | | | | | | | | | | |
| Mangrove | | | | | | | | | 4,000 | 107 |
| Red | | | 2,200 | 220 | | | | | | |
| Snook or sergeantfish | | | | | 1,500 | 30 | | | 11,200 | 204 |
| Spanish mackerel | | | 1,200 | 96 | 548,200 | 27,410 | | | 88,800 | 3,552 |
| Spot | | | | | 3,000 | 45 | | | | |
| Squeteagues or "sea trout": | | | | | | | | | | |
| Spotted | | | 4,200 | 336 | 57,000 | 3,420 | 4,400 | 320 | 85,300 | 4,476 |
| White | | | | | | | 1,100 | 30 | | |
| Sunfish | 237,600 | 7,028 | | | | | | | | |
| Tuna or "horse mackerel" | | | 1,300 | 41 | | | | | | |
| Shrimp | | | 9,656,300 | 298,525 | | | | | | |
| Clams, hard, public | | | 32,400 | 648 | | | | | 500 | 50 |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | | | | | 10,200 | 750 | 800 | 170 |
| Market, public, fall | | | | | | | 17,000 | 1,250 | 6,800 | 1,360 |
| Market, private, spring | | | 102,800 | 2,293 | | | | | | |
| Market, private, fall | | | 122,900 | 2,827 | | | | | | |
| Scallops: | | | | | | | | | | |
| Bay | | | | | | | | | 2,400 | 225 |
| Sea | | | 120,200 | 17,891 | | | | | | |
| Turtles, soft shell | 7,400 | 76 | | | | | | | | |
| Total | 2,220,300 | 91,001 | 10,244,300 | 333,983 | 1,503,800 | 63,989 | 180,900 | 7,023 | 1,488,600 | 50,776 |

| Species | Seminole | | Taylor | | Volusia | | Wakulla | | Walton | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Black bass | | | | | 16,000 | $960 | | | | |
| Bluefish | | | 6,600 | $330 | 5,000 | 280 | 10,000 | $500 | | |
| Blue runner or hardtail | | | | | | | 3,000 | 60 | | |
| Catfish and bullheads | 430,000 | $15,050 | | | 90,500 | 3,167 | | | | |
| Crappie | 7,000 | 210 | | | 18,500 | 740 | | | | |
| Crevalle | | | | | 3,000 | 60 | | | | |
| Croaker | | | | | 4,000 | 120 | 500 | 10 | | |
| Drum: | | | | | | | | | | |
| Black | | | | | 30,000 | 750 | | | | |
| Red or redfish | | | 24,200 | 660 | 52,000 | 1,455 | 25,000 | 684 | 3,100 | $84 |
| Flounders | | | 500 | 15 | 4,000 | 250 | 200 | 6 | | |
| Kingfish or "king mackerel" | | | 500 | 20 | | | | | | |
| King whiting or "kingfish" | | | | | 45,000 | 1,250 | | | | |
| Mullet | | | 315,000 | 9,450 | 574,000 | 15,345 | 1,136,500 | 34,095 | 90,000 | 2,700 |
| Pigfish | | | | | 20,000 | 300 | | | | |
| Pinfish or sailors choice | | | | | 1,000 | 20 | | | | |
| Pompano | | | 500 | 100 | 3,000 | 600 | 1,000 | 200 | 100 | 15 |
| Shad | 226,000 | 13,560 | | | 1,000 | 120 | | | | |

*Fisheries of Florida, 1934*—Continued

CATCH: By counties—Continued

| Species | Seminole | | Taylor | | Volusia | | Wakulla | | Walton | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Sheepshead | | | 2,800 | $75 | 2,000 | $40 | 5,500 | $150 | 800 | $21 |
| Snapper, mangrove | | | | | 1,500 | 30 | | | | |
| Spot | | | | | 13,500 | 280 | | | | |
| Squeteagues or "sea trout", spotted | | | 91,700 | 4,354 | 90,000 | 5,430 | 149,300 | 6,790 | 13,500 | 615 |
| Sunfish | 7,000 | $210 | | | 27,300 | 819 | | | | |
| White perch | 18,200 | 728 | | | | | | | | |
| Crabs, hard | | | | | 8,000 | 240 | | | | |
| Shrimp | | | | | 482,300 | 14,469 | | | | |
| Clams, hard, public | | | | | 500 | 50 | | | | |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | | | 4,500 | 750 | 5,200 | 210 | 1,500 | 135 |
| Market, public, fall | | | | | | | 7,600 | 315 | 1,000 | 114 |
| Market, private, spring | | | | | 72,900 | 5,400 | | | | |
| Market, private, fall | | | | | 38,700 | 2,940 | | | | |
| Turtles, soft shell | | | | | 3,000 | 30 | | | | |
| Sponges: | | | | | | | | | | |
| Grass | | | 1,000 | 515 | | | | | | |
| Sheepswool | | | 45,400 | 48,900 | | | | | | |
| Yellow | | | 6,700 | 5,200 | | | | | | |
| Total | 688,200 | 29,758 | 494,900 | 69,619 | 1,611,200 | 55,895 | 1,343,800 | 43,020 | 110,000 | 3,684 |

CATCH: By districts

| Species | East coast | | West coast | | Lake Okeechobee | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Alewives | 214,900 | $1,055 | | | | |
| Amberjack | 2,500 | 55 | 1,500 | $25 | | |
| Black bass | 144,900 | 9,303 | | | 278,000 | $15,892 |
| Bluefish | 1,445,400 | 81,007 | 488,500 | 19,668 | | |
| Blue runner or hardtail | 60,700 | 1,224 | 120,400 | 1,850 | | |
| Cabio or crab eater | | | 7,400 | 181 | | |
| Catfish and bullheads | 2,039,300 | 70,349 | 63,000 | 1,968 | 751,900 | 21,160 |
| Cigarfish | | | 4,500 | 90 | | |
| Crappie | 145,400 | 5,605 | | | 316,900 | 6,351 |
| Crevalle | 81,600 | 1,354 | 29,400 | 211 | | |
| Croaker | 45,000 | 1,045 | 7,400 | 149 | | |
| Dolphin | 8,000 | 240 | | | | |
| Drum: | | | | | | |
| Black | 89,000 | 1,960 | 11,100 | 205 | | |
| Red or redfish | 144,200 | 3,820 | 872,700 | 20,457 | | |
| Eels | 18,400 | 553 | | | | |
| Flounders | 20,300 | 1,036 | 54,500 | 2,106 | | |
| Groupers | 183,800 | 7,776 | 3,157,600 | 71,714 | | |
| Grunts | 32,000 | 960 | 8,300 | 178 | | |
| Hickory shad | 42,900 | 352 | | | | |
| Hogfish | 6,000 | 180 | | | | |
| Jewfish | 5,000 | 200 | 8,400 | 208 | | |
| Kingfish or "king mackerel" | 1,977,500 | 89,673 | 660,600 | 26,424 | | |
| King whiting or "kingfish" | 319,400 | 7,741 | 5,200 | 103 | | |
| Mackerel | 200 | 9 | | | | |
| Menhaden | 29,404,200 | 99,357 | 9,579,200 | 22,286 | | |
| Mojarro | 5,000 | 100 | 14,100 | 291 | | |
| Mullet | 4,061,500 | 92,131 | 19,904,800 | 548,996 | | |
| Muttonfish | 175,800 | 7,810 | 23,100 | 1,029 | | |
| Permit | | | 1,700 | 34 | | |
| Pigfish | 56,000 | 1,005 | 38,800 | 818 | | |
| Pinfish or sailors choice | 31,000 | 620 | | | | |
| Pompano | 177,100 | 28,550 | 260,400 | 49,584 | | |
| Porgies | 11,500 | 345 | 27,000 | 589 | | |
| Sawfish | | | 17,500 | 35 | | |
| Sea bass | 48,000 | 1,902 | 4,000 | 120 | | |
| Sea catfish | | | 105,000 | 210 | | |
| Shad | 782,200 | 66,986 | | | | |
| Sharks | 200,000 | 1,000 | 3,017,500 | 7,535 | | |
| Sheepshead | 124,000 | 2,580 | 481,900 | 10,686 | | |
| Skates | | | 175,000 | 350 | | |
| Snapper: | | | | | | |
| Mangrove | 72,500 | 2,356 | 156,200 | 4,661 | | |
| Red | 151,600 | 9,963 | 3,916,200 | 214,308 | | |
| Snook or sergeantfish | 145,700 | 4,319 | 276,100 | 5,627 | | |
| Spanish mackerel | 3,385,700 | 141,392 | 3,348,500 | 130,395 | | |
| Spot | 80,500 | 1,605 | 1,600 | 37 | | |

*Fisheries of Florida, 1934*—Continued

CATCH: BY DISTRICTS—Continued

| Species | East coast | | West coast | | Lake Okeechobee | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Squeteagues or "sea trout": | | | | | | |
| Gray | 10,000 | $500 | | | | |
| Spotted | 760,600 | 43,817 | 2,322,600 | $119,458 | | |
| White | | | 14,300 | 296 | | |
| Sturgeon | | | 1,000 | 60 | | |
| Sunfish | 299,900 | 9,177 | | | 217,600 | $4,367 |
| Swordfish | 3,000 | 45 | | | | |
| Tenpounder | | | 27,500 | 482 | | |
| Tripletail | | | 600 | 12 | | |
| Tuna or "horse mackerel" | 4,300 | 161 | | | | |
| Turbot | 1,500 | 45 | | | | |
| Wahoo | 2,000 | 60 | | | | |
| White perch | 18,200 | 728 | | | | |
| Yellowtail | 13,100 | 1,179 | 68,300 | 3,498 | | |
| Crabs: | | | | | | |
| Hard | 133,800 | 2,734 | 49,000 | 740 | | |
| King | | | 500,000 | 600 | | |
| Stone | 13,600 | 2,992 | 67,000 | 2,745 | | |
| Sea crawfish or "spiny lobster" | 182,800 | 10,426 | 168,500 | 6,740 | | |
| Shrimp | 14,752,700 | 451,685 | 1,539,500 | 46,185 | | |
| Clams: | | | | | | |
| Coquina | | | 5,800 | 975 | | |
| Hard, public | 32,900 | 698 | 502,100 | 25,384 | | |
| Conchs | | | 2,500 | 75 | | |
| Oysters: | | | | | | |
| Market, public, spring | 4,500 | 750 | 822,900 | 39,822 | | |
| Market, public, fall | | | 509,700 | 30,573 | | |
| Market, private, spring | 344,400 | 15,096 | 17,400 | 1,560 | | |
| Market, private, fall | 330,300 | 13,170 | 6,800 | 660 | | |
| Scallops: | | | | | | |
| Bay | | | 74,100 | 6,596 | | |
| Sea | 120,200 | 17,891 | | | | |
| Turtles: | | | | | | |
| Green | | | 4,600 | 244 | | |
| Soft shell | 10,400 | 106 | 6,000 | 120 | 44,800 | 571 |
| Sponges: | | | | | | |
| Grass | | | 45,400 | 24,699 | | |
| Sheepswool | | | 458,500 | 720,257 | | |
| Velvet | | | 200 | 110 | | |
| Wire | | | 14,400 | 7,894 | | |
| Yellow | | | 136,800 | 84,690 | | |
| Total | 62,976,900 | 1,318,778 | 54,214,600 | 2,267,603 | 1,609,200 | 48,341 |

*Sponge fishery of Florida, 1934*

OPERATING UNITS: BY GEAR

| Item | Sponge hooks | Diving outfits | Total |
|---|---|---|---|
| | *Number* | *Number* | *Number* |
| Fishermen: | | | |
| On vessels | | 8 | 8 |
| On boats and shore, regular | 482 | 393 | 875 |
| Total | 482 | 401 | 883 |
| Vessels, motor | | 1 | 1 |
| Net tonnage | | 5 | 5 |
| Boats: | | | |
| Motor | | 52 | 52 |
| Other | 241 | | 241 |
| Apparatus, number | 241 | 53 | 294 |

CATCH: BY GEAR

| Sponges | Sponge hooks | | Diving outfits | | Total | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Grass | 45,400 | $24,699 | | | 45,400 | $24,699 |
| Sheepswool | 129,900 | 190,756 | 328,600 | $529,501 | 458,500 | 720,257 |
| Velvet | 200 | 110 | | | 200 | 110 |
| Wire | 300 | 88 | 14,100 | 7,806 | 14,400 | 7,894 |
| Yellow | 62,100 | 34,541 | 74,700 | 50,149 | 136,800 | 84,690 |
| Total | 237,900 | 250,194 | 417,400 | 587,456 | 655,300 | 837,650 |

SPONGES SOLD AT THE EXCHANGE, TARPON SPRINGS, FLA.

During 1934 sponges sold on the exchange at Tarpon Springs, Fla., amounted to 499,635 pounds, valued at $670,533. This is an increase of 34 percent in volume and 59 percent in value as compared with the transactions on the exchange in 1933. Of the total sponges sold, 137,879 pounds, valued at $287,062, were large wool; 28,751 pounds, valued at $34,654, were medium and small wool; 183,956 pounds, valued at $250,858, were wool rags; 105,572 pounds, valued at $70,560, were yellow; 29,391 pounds, valued at $19,503, were grass; and 14,086 pounds, valued at $7,806, were wire. It is estimated that sponges valued at $25,000 were sold outside the exchange.

## ALABAMA

*Fisheries of Alabama, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Gill nets, stake | Trammel nets | Lines | | | Fyke nets |
|---|---|---|---|---|---|---|---|
| | | | | Hand | Trot with baits or snoods | Trot with hooks | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | 70 | | | |
| On boats and shore: | | | | | | | |
| Regular | 48 | 3 | 64 | 9 | 12 | 22 | 2 |
| Casual | | | 7 | 47 | 20 | 5 | |
| Total | 48 | 3 | 71 | 126 | 32 | 27 | 2 |
| Vessels, motor | | | | 9 | | | |
| Net tonnage | | | | 114 | | | |
| Boats: | | | | | | | |
| Motor | 9 | 1 | 25 | 2 | 2 | 4 | 2 |
| Other | 6 | 3 | 58 | 21 | 28 | 27 | |
| Apparatus: | | | | | | | |
| Number | 8 | 16 | 57 | 126 | 38 | 112 | 10 |
| Length, yards | 4,350 | | | | | | |
| Square yards | | 2,450 | 18,745 | | | | |
| Hooks, baits, or snoods | | | | 204 | 7,640 | 11,550 | |

| Item | Otter trawls, shrimp | Pots, fish | Spears | Dredges, oyster | Tongs, oyster | By hand, other than for oysters | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 50 | | | 18 | 4 | | 122 |
| On boats and shore: | | | | | | | |
| Regular | 270 | 16 | 2 | | 94 | 2 | 436 |
| Casual | | 3 | 58 | | 8 | 44 | 125 |
| Total | 320 | 19 | 60 | 18 | 106 | 46 | 683 |
| Vessels, motor | 25 | | | 8 | 2 | | 34 |
| Net tonnage | 225 | | | 58 | 16 | | 339 |
| Boats: | | | | | | | |
| Motor | 135 | 3 | | | 42 | | 184 |
| Other | | 19 | | | 37 | | 160 |
| Apparatus: | | | | | | | |
| Number | 160 | 78 | 60 | 9 | 106 | | |
| Yards at mouth | 2,067 | | | 9 | | | |

*Fisheries of Alabama, 1934*—Continued

CATCH: BY GEAR

| Species | Haul seines | | Gill nets, stake | | Trammel nets | | Lines | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Hand | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | 25,200 | $588 | | | 3,400 | $166 | | |
| Blue runner or hardtail | 2,900 | 58 | | | | | | |
| Catfish and bullheads | 200 | 4 | | | 2,200 | 88 | 2,400 | $96 |
| Crevalle | 2,600 | 58 | | | | | | |
| Croaker | 10,800 | 196 | | | 9,000 | 164 | 1,400 | 26 |
| Drum: | | | | | | | | |
| Black | 700 | 20 | | | | | | |
| Red or redfish | 19,300 | 776 | | | 37,500 | 1,374 | 7,900 | 292 |
| Flounders | 500 | 35 | | | 2,500 | 171 | | |
| Groupers | | | | | | | 151,200 | 3,356 |
| King whiting or "kingfish" | 3,800 | 70 | | | 900 | 18 | 100 | 2 |
| Mullet | 528,200 | 12,387 | | | 640,000 | 16,000 | | |
| Pompano | | | | | 1,800 | 270 | | |
| Sheepshead | 1,000 | 37 | | | 5,200 | 196 | 1,800 | 72 |
| Snapper, red | | | | | | | 950,500 | 51,859 |
| Spanish mackerel | 1,700 | 121 | | | 10,200 | 412 | | |
| Spot | 4,600 | 85 | | | 3,100 | 56 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 25,100 | 1,611 | | | 102,300 | 6,860 | 10,100 | 682 |
| White | 1,300 | 30 | | | 3,400 | 81 | 2,900 | 65 |
| Sturgeon | | | 8,400 | $912 | | | | |
| Tenpounder | 1,200 | 12 | | | | | | |
| Total | 629,100 | 16,088 | 8,400 | 912 | 821,500 | 25,856 | 1,128,300 | 56,450 |

| Species | Lines—Continued | | | | Fyke nets | | Otter trawls | |
|---|---|---|---|---|---|---|---|---|
| | Trot with baits or snoods | | Trot with hooks | | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Buffalofish | | | 16,200 | $648 | 2,400 | $96 | | |
| Catfish and bullheads | | | 50,500 | 3,030 | 14,000 | 840 | | |
| Paddlefish or spoonbill cat | | | 600 | 36 | | | | |
| Crabs, hard | 257,400 | $3,677 | | | | | | |
| Shrimp | | | | | | | 4,556,600 | $115,176 |
| Total | 257,400 | 3,677 | 67,300 | 3,714 | 16,400 | 936 | 4,556,600 | 115,176 |

| Species | Pots | | Spears | | Dredges | | Tongs | | By hand | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Lb.* | *Value* | *Lb.* | *Value* | *Lb.* | *Value* | *Lb.* | *Value* | *Lb.* | *Value* |
| Catfish and bullheads | 51,300 | $3,578 | | | | | | | | |
| Flounders | | | 32,900 | $2,512 | | | | | | |
| Crabs, soft | | | | | | | | | 1,600 | $312 |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | | | 105,600 | $6,224 | 89,900 | $5,285 | | |
| Market, public, fall | | | | | 4,200 | 250 | 160,400 | 9,435 | | |
| Market, private, spring | | | | | | | 5,400 | 450 | | |
| Market, private, fall | | | | | | | 26,300 | 2,190 | | |
| Terrapin, diamond back | | | | | | | | | 1,400 | 361 |
| Total | 51,300 | 3,578 | 32,900 | 2,512 | 109,800 | 6,474 | 282,000 | 17,360 | 3,000 | 673 |

*Fisheries of Alabama, 1934*—Continued

OPERATING UNITS: BY COUNTIES

| Item | Baldwin | Mobile |
|---|---|---|
| Fishermen: | *Number* | *Number* |
| On vessels | 14 | 108 |
| On boats and shore: | | |
| Regular | 65 | 371 |
| Casual | 33 | 92 |
| Total | 112 | 571 |
| Vessels, motor | 7 | 27 |
| Net tonnage | 72 | 267 |
| Boats: | | |
| Motor | 24 | 160 |
| Other | 37 | 123 |
| Apparatus: | | |
| Haul seines | 1 | 7 |
| Length, yards | 500 | 3,850 |
| Gill nets, stake | 16 | ---------- |
| Square yards | 2,450 | ---------- |
| Trammel nets | 22 | 35 |
| Square yards | 8,390 | 10,355 |
| Lines: | | |
| Hand | 15 | 111 |
| Hooks | 15 | 189 |
| Trot with baits or snoods | ---------- | 38 |
| Baits or snoods | ---------- | 7,640 |
| Trot with hooks | 4 | 108 |
| Hooks | 750 | 10,800 |
| Fyke nets | ---------- | 10 |
| Otter trawls, shrimp | 15 | 145 |
| Yards at mouth | 189 | 1,878 |
| Pots, fish | ---------- | 78 |
| Spears | 22 | 38 |
| Dredges, oyster | ---------- | 9 |
| Yards at mouth | ---------- | 9 |
| Tongs, oyster | 26 | 80 |

CATCH: BY COUNTIES

| Species | Baldwin | | Mobile | |
|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* |
| Bluefish | 3,900 | $177 | 24,700 | $577 |
| Blue runner or hardtail | 600 | 12 | 2,300 | 46 |
| Buffalofish | ---------- | ---------- | 18,600 | 744 |
| Catfish and bullheads | 6,500 | 370 | 114,100 | 7,266 |
| Crevalle | ---------- | ---------- | 2,600 | 58 |
| Croaker | 5,700 | 104 | 15,500 | 282 |
| Drum: | | | | |
| Black | 200 | 6 | 500 | 14 |
| Red or redfish | 27,700 | 1,012 | 37,000 | 1,430 |
| Flounders | 3,600 | 269 | 32,300 | 2,449 |
| Groupers | ---------- | ---------- | 151,200 | 3,356 |
| King whiting or "kingfish" | 300 | 6 | 4,500 | 84 |
| Mullet | 283,000 | 7,085 | 885,200 | 21,302 |
| Paddlefish or spoonbill cat | ---------- | ---------- | 600 | 36 |
| Pompano | 1,600 | 240 | 200 | 30 |
| Sheepshead | 3,700 | 144 | 4,300 | 161 |
| Snapper, red | ---------- | ---------- | 950,500 | 51,859 |
| Spanish mackerel | 10,600 | 442 | 1,300 | 91 |
| Spot | 2,000 | 38 | 5,700 | 103 |
| Squeteagues or "sea trout": | | | | |
| Spotted | 44,200 | 3,184 | 93,300 | 5,969 |
| White | ---------- | ---------- | 7,600 | 176 |
| Sturgeon | 8,400 | 912 | ---------- | ---------- |
| Tenpounder | ---------- | ---------- | 1,200 | 12 |
| Crabs: | | | | |
| Hard | ---------- | ---------- | 257,400 | 3,677 |
| Soft | ---------- | ---------- | 1,600 | 312 |
| Shrimp | 392,000 | 8,976 | 4,164,600 | 106,200 |
| Oysters: | | | | |
| Market, public, spring | 8,500 | 500 | 187,000 | 11,009 |
| Market, public, fall | 17,000 | 1,000 | 147,600 | 8,685 |
| Market, private, spring | 5,400 | 450 | ---------- | ---------- |
| Market, private, fall | 26,300 | 2,190 | ---------- | ---------- |
| Terrapin, diamond back | 800 | 203 | 600 | 158 |
| Total | 852,000 | 27,320 | 7,112,000 | 226,086 |

## MISSISSIPPI

*Fisheries of Mississippi, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Trammel nets | Lines | | Dip nets, drop | Cast nets |
|---|---|---|---|---|---|---|
| | | | Hand | Trot with baits or snoods | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | 15 | | | |
| On boats and shore: | | | | | | |
| Regular | 6 | 41 | 12 | 86 | | |
| Casual | | | 132 | 13 | 30 | 64 |
| Total | 6 | 41 | 159 | 99 | 30 | 64 |
| Vessels, motor | | | 3 | | | |
| Net tonnage | | | 25 | | | |
| Boats: | | | | | | |
| Motor | 1 | 18 | 9 | 32 | | |
| Other | 1 | 31 | 94 | 65 | 14 | |
| Apparatus: | | | | | | |
| Number | 1 | 27 | 159 | 99 | 120 | 64 |
| Length, yards | 300 | | | | | |
| Square yards | | 7,370 | | | | |
| Hooks, baits, or snoods | | | 178 | 19,260 | | |

| Item | Otter trawls, shrimp | Spears | Dredges, oyster | Tongs, oyster | By hand, other than for oysters | Total, exclusive of duplication |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 164 | | 520 | | | 557 |
| On boats and shore: | | | | | | |
| Regular | 568 | 2 | 276 | 217 | | 917 |
| Casual | | 70 | | 7 | 38 | 232 |
| Total | 732 | 72 | 796 | 224 | 38 | 1,706 |
| Vessels, motor | 82 | | 130 | | | 144 |
| Net tonnage | 916 | | 1,777 | | | 1,905 |
| Boats: | | | | | | |
| Motor | 284 | | 69 | 8 | | 341 |
| Other | | | | 208 | | 361 |
| Apparatus: | | | | | | |
| Number | 366 | 72 | 398 | 224 | | |
| Yards at mouth | 4,658 | | 398 | | | |

CATCH: BY GEAR

| Species | Haul seines | | Trammel nets | | Lines | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Hand | | Trot with baits or snoods | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | | | 14,000 | $280 | 16,300 | $326 | | |
| Croaker | | | 6,000 | 150 | 7,600 | 189 | | |
| Drum: | | | | | | | | |
| Black | | | 2,200 | 36 | 1,600 | 23 | | |
| Red or redfish | 8,000 | $320 | 53,300 | 2,100 | 11,700 | 468 | | |
| Flounders | | | 4,500 | 225 | | | | |
| Groupers | | | | | 55,000 | 1,250 | | |
| King whiting or "kingfish" | | | 2,200 | 54 | 1,400 | 35 | | |
| Mullet | 137,000 | 2,740 | 482,000 | 10,950 | | | | |
| Sheepshead | 8,000 | 320 | 13,300 | 532 | 1,700 | 68 | | |
| Snapper, red | | | | | 123,200 | 6,720 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 12,000 | 720 | 82,500 | 4,950 | 52,400 | 3,144 | | |
| White | 30,000 | 750 | 73,000 | 1,825 | 50,500 | 1,263 | | |
| Crabs, hard | | | | | | | 548,100 | $6,412 |
| Total | 195,000 | 4,850 | 733,000 | 21,102 | 321,400 | 13,486 | 548,100 | 6,412 |

*Fisheries of Mississippi, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Dip nets, drop | | Cast nets | | Otter trawls, shrimp | | Spears | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders | | | | | 6, 500 | $325 | 31, 000 | $1, 860 |
| Mullet | | | 25, 500 | $532 | | | | |
| Crabs, hard | 54, 600 | $702 | | | | | | |
| Shrimp: | | | | | | | | |
| Mississippi | | | 6, 500 | 650 | 6, 589, 200 | 125, 512 | | |
| Louisiana | | | | | 8, 734, 100 | 166, 360 | | |
| Total | 54, 600 | 702 | 32, 000 | 1, 182 | 15, 329, 800 | 292, 197 | 31, 000 | 1, 860 |

| Species | Dredges | | Tongs | | By hand | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs, soft | | | | | 4, 200 | $720 |
| Oysters: | | | | | | |
| Market, public, spring, Mississippi | 26, 700 | $1, 805 | 55, 400 | $4, 693 | | |
| Market, public, fall, Mississippi | 155, 400 | 10, 500 | 60, 600 | 5, 126 | | |
| Market, public, spring, Louisiana | 3, 659, 600 | 237, 202 | 8, 100 | 674 | | |
| Market, public, fall, Louisiana | 937, 700 | 49, 759 | 400 | 31 | | |
| Total | 4, 779, 400 | 299, 266 | 124, 500 | 10, 524 | 4, 200 | 720 |

OPERATING UNITS: BY COUNTIES

| Item | Hancock | Harrison | Jackson |
|---|---|---|---|
| | *Number* | *Number* | *Number* |
| Fishermen: | | | |
| On vessels | | 538 | 19 |
| On boats and shore: | | | |
| Regular | 48 | 744 | 125 |
| Casual | 40 | 138 | 54 |
| Total | 88 | 1, 420 | 198 |
| Vessels, motor | | 139 | 5 |
| Net tonnage | | 1, 827 | 78 |
| Boats: | | | |
| Motor | 14 | 277 | 50 |
| Other | 30 | 275 | 56 |
| Apparatus: | | | |
| Haul seines | | | 1 |
| Length, yards | | | 300 |
| Trammel nets | 6 | 10 | 11 |
| Square yards | 1, 800 | 2, 465 | 3, 105 |
| Lines: | | | |
| Hand | 29 | 94 | 36 |
| Hooks | 29 | 104 | 45 |
| Trot with baits or snoods | | 88 | 11 |
| Baits or snoods | | 18, 100 | 1, 160 |
| Dip nets, drop | 120 | | |
| Cast nets | | 57 | 7 |
| Otter trawls, shrimp | | 319 | 47 |
| Yards at mouth | | 4, 080 | 578 |
| Spears | 10 | 42 | 20 |
| Dredges, oyster | 16 | 370 | 12 |
| Yards at mouth | 16 | 370 | 12 |
| Tongs, oyster | 4 | 191 | 29 |

*Fisheries of Mississippi, 1934*—Continued

CATCH: BY COUNTIES

| Species | Hancock | | Harrison | | Jackson | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish or bullheads | 2,100 | $42 | 22,800 | $456 | 5,400 | $108 |
| Croaker | 1,700 | 42 | 7,800 | 194 | 4,100 | 103 |
| Drum: | | | | | | |
| Black | 1,100 | 17 | 1,700 | 22 | 1,000 | 20 |
| Red or redfish | 18,500 | 740 | 31,700 | 1,268 | 22,800 | 880 |
| Flounders | 7,500 | 425 | 29,700 | 1,705 | 4,800 | 280 |
| Groupers | | | 38,500 | 875 | 16,500 | 375 |
| King whiting or "kingfish" | 1,400 | 35 | 2,100 | 52 | 100 | 2 |
| Mullet | 75,000 | 1,500 | 127,500 | 2,822 | 442,000 | 9,900 |
| Sheepshead | 1,600 | 64 | 2,700 | 108 | 18,700 | 748 |
| Snapper, red | | | 88,000 | 4,800 | 35,200 | 1,920 |
| Squeteagues or "sea trout": | | | | | | |
| Spotted | 38,000 | 2,280 | 62,000 | 3,720 | 46,900 | 2,814 |
| White | 30,000 | 750 | 55,000 | 1,375 | 68,500 | 1,713 |
| Crabs: | | | | | | |
| Hard | 54,600 | 702 | 506,100 | 5,932 | 42,000 | 480 |
| Soft | 1,400 | 280 | 2,800 | 440 | | |
| Shrimp: | | | | | | |
| Mississippi | | | 4,287,900 | 82,084 | 2,307,800 | 44,078 |
| Louisiana | | | 8,219,400 | 156,560 | 514,700 | 9,800 |
| Oysters: | | | | | | |
| Market, public, spring, Mississippi | 6,600 | 562 | 33,300 | 2,819 | 42,200 | 3,117 |
| Market, public, fall, Mississippi | 164,500 | 11,269 | 2,400 | 205 | 49,100 | 4,152 |
| Market, public, spring, Louisiana | | | 3,592,900 | 233,023 | 74,800 | 4,853 |
| Market, public, fall, Louisiana | | | 938,100 | 49,790 | | |
| Total | 404,000 | 18,708 | 18,052,400 | 548,250 | 3,696,600 | 85,343 |

## LOUISIANA

*Fisheries of Louisiana, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Trammel nets | Lines | | | Dip nets | |
|---|---|---|---|---|---|---|---|
| | | | Hand | Trot with baits or snoods | Trot with hooks | Common | Drop |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 11 | 6 | 5 | | | | |
| On boats and shore: | | | | | | | |
| Regular | 568 | 76 | 89 | 242 | | 94 | 187 |
| Casual | 64 | 58 | 149 | 138 | 4 | 65 | 113 |
| Total | 643 | 140 | 243 | 380 | 4 | 159 | 300 |
| Vessels, motor | 2 | 3 | 1 | | | | |
| Net tonnage | 13 | 20 | 5 | | | | |
| Boats: | | | | | | | |
| Motor | 78 | 63 | 72 | 37 | | | 13 |
| Other | 111 | | 71 | 343 | 4 | 153 | 283 |
| Accessory boats | 1 | | | | | | |
| Apparatus: | | | | | | | |
| Number | 95 | 75 | 242 | 380 | 4 | 159 | 13,369 |
| Length, yards | 21,404 | | | | | | |
| Square yards | | 13,599 | | | | | |
| Hooks, baits, or snoods | | | 253 | 83,035 | 1,800 | | |

*Fisheries of Louisiana, 1934*—Continued

OPERATING UNITS: BY GEAR—Continued

| Item | Cast nets | Otter trawls, shrimp | Brush traps | Dredges, oyster | Tongs, oyster | Total, exclusive of duplication |
|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | |
| On vessels | | 240 | | 59 | 111 | 369 |
| On boats and shore: | | | | | | |
| Regular | 59 | 2,993 | 101 | 32 | 647 | 4,529 |
| Casual | 119 | | | 6 | | 626 |
| Total | 178 | 3,233 | 101 | 97 | 758 | 5,524 |
| Vessels, motor | | 112 | | 17 | 45 | 151 |
| Net tonnage | | 754 | | 166 | 313 | 1,056 |
| Boats: | | | | | | |
| Motor | | 1,499 | | 15 | 3 | 1,698 |
| Other | 68 | | 101 | | 343 | 1,243 |
| Accessory boats | | | | | 61 | 62 |
| Apparatus: | | | | | | |
| Number | 178 | 1,611 | 25,250 | 57 | 758 | |
| Yards at mouth | | 19,354 | | 58 | | |

CATCH: BY GEAR

| Species | Haul seines | | Trammel nets | | Lines | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Hand | | Trot with baits or snoods | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 84,200 | $2,918 | 69,100 | $2,468 | 43,700 | $1,484 | | |
| Crevalle | 100 | 4 | 1,000 | 31 | | | | |
| Croaker | 145,000 | 7,138 | 67,500 | 3,192 | 84,400 | 4,367 | | |
| Drum: | | | | | | | | |
| Black | 74,100 | 2,613 | 66,300 | 2,415 | 58,100 | 2,100 | | |
| Red or redfish | 128,200 | 7,650 | 180,900 | 10,163 | 182,500 | 10,278 | | |
| Flounders | 4,900 | 381 | 16,800 | 1,317 | 2,600 | 197 | | |
| Garfish | | | 500 | 2 | | | | |
| Groupers | | | | | 18,400 | 770 | | |
| Jewfish | 300 | 9 | 1,300 | 38 | 3,400 | 93 | | |
| Kingfish or "king mackerel" | 1,200 | 49 | 12,200 | 396 | | | | |
| Mullet | 16,400 | 251 | 1,600 | 27 | | | | |
| Sheepshead | 152,100 | 8,367 | 78,000 | 4,147 | 37,400 | 2,042 | | |
| Snapper, red | | | | | 79,000 | 4,550 | | |
| Spanish mackerel | | | | | 1,900 | 96 | | |
| Spot | 200 | 10 | 1,700 | 57 | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 385,300 | 30,389 | 250,200 | 20,216 | 433,500 | 35,941 | | |
| White | 244,600 | 5,844 | 122,800 | 3,112 | 77,500 | 2,082 | | |
| Tripletail | | | | | 200 | 4 | | |
| Crabs, hard | 496,000 | 16,352 | | | | | 8,624,900 | $88,060 |
| Shrimp | 5,769,500 | 149,888 | | | | | | |
| Turtles, loggerhead | 3,500 | 70 | | | | | | |
| Total | 7,505,600 | 231,933 | 869,900 | 47,581 | 1,022,600 | 64,004 | 8,624,900 | 88,060 |

| Species | Lines—Con. | | Dip nets | | | | Cast nets | |
|---|---|---|---|---|---|---|---|---|
| | Trot with hooks | | Common | | Drop | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Croaker | 4,000 | $480 | | | | | | |
| Drum, red or redfish | 900 | 109 | | | | | | |
| Squeteagues or "sea trout", spotted | 4,000 | 500 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | | | 353,100 | $6,364 | 2,202,500 | $53,166 | | |
| Soft | | | 131,100 | 19,869 | | | | |
| Shrimp | | | | | | | 553,700 | $10,918 |
| Total | 8,900 | 1,089 | 484,200 | 26,233 | 2,202,500 | 53,166 | 553,700 | 10,918 |

*Fisheries of Louisiana, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Otter trawls | | Brush traps | | Dredges | | Tongs | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs, soft | | | 520,100 | $65,700 | | | | |
| Shrimp | 49,249,100 | $1,281,564 | | | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | | | | | 1,006,900 | $75,424 | 36,800 | $3,892 |
| Market, public, fall | | | | | 253,100 | 32,105 | 23,300 | 2,100 |
| Market, private, spring | | | | | 14,900 | 1,491 | 1,957,800 | 131,089 |
| Market, private, fall | | | | | 5,300 | 558 | 2,293,600 | 167,656 |
| Total | 49,249,100 | 1,281,564 | 520,100 | 65,700 | 1,280,200 | 109,578 | 4,311,500 | 304,737 |

NOTE.—The catch as shown above for Louisiana does not include the following products which were taken by Mississippi craft in Louisiana waters: Shrimp, 8,734,100 pounds, valued at $166,360; and oysters, market, spring, 3,667,700 pounds, of meats, valued at $237,876, and oysters, market, fall, 938,100 pounds of meats, valued at $49,790. These products have been included with the Mississippi catch.

OPERATING UNITS: BY PARISHES

| Item | Calcasieu | Cameron | Iberia | Jefferson Davis | Jefferson | La Fourche | Orleans | Plaquemines |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | 44 | 120 | 63 | 40 |
| On boats and shore: | | | | | | | | |
| Regular | | 6 | 8 | 2 | 1,180 | 760 | 207 | 491 |
| Casual | 3 | | 2 | 2 | 38 | | 121 | 40 |
| Total | 3 | 6 | 10 | 4 | 1,262 | 880 | 391 | 571 |
| Vessels, motor | | | | | 19 | 46 | 20 | 20 |
| Net tonnage | | | | | 143 | 311 | 177 | 122 |
| Boats: | | | | | | | | |
| Motor | 1 | 3 | 5 | 2 | 368 | 314 | 53 | 185 |
| Other | 1 | | | | 284 | 81 | 123 | 91 |
| Accessory boats | | | | | 4 | 32 | 2 | 10 |
| Apparatus: | | | | | | | | |
| Haul seines | | | | | 25 | 1 | 21 | 4 |
| Length, yards | | | | | 10,570 | 400 | 2,263 | 1,560 |
| Trammel nets | | | 1 | | 10 | 1 | 2 | 28 |
| Square yards | | | 175 | | 1,903 | 180 | 450 | 5,175 |
| Lines: | | | | | | | | |
| Hand | 2 | | | 4 | 25 | | 68 | 27 |
| Hooks | 2 | | | 4 | 25 | | 79 | 27 |
| Trot with baits or snoods | | | | | 132 | | 18 | 11 |
| Bait or snoods | | | | | 38,185 | | 7,450 | 1,650 |
| Dip nets: | | | | | | | | |
| Common | 1 | | | | | | 24 | |
| Drop | | | | | 1,950 | | 5,417 | |
| Brush traps | | | | | 25,250 | | | |
| Cast nets | | | | | 30 | | 78 | |
| Otter trawls, shrimp | | 3 | 2 | 1 | 354 | 347 | 26 | 174 |
| Yards at mouth | | 35 | 24 | 12 | 4,278 | 4,178 | 337 | 2,096 |
| Dredges, oyster | | | 2 | | 8 | 4 | 26 | 11 |
| Yards at mouth | | | 2 | | 8 | 4 | 26 | 11 |
| Tongs, oyster | | | | | 14 | 209 | 8 | 155 |

| Item | St. Bernard | St. Charles | St. John the Baptist | St. Mary | St. Tammany | Tangipahoa | Terrebonne | Vermilion |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 11 | | | | 2 | | 89 | |
| On boats and shore: | | | | | | | | |
| Regular | 383 | 80 | 1 | 138 | 42 | 13 | 1,216 | 2 |
| Casual | 150 | 24 | 40 | 64 | 36 | 7 | 93 | 6 |
| Total | 544 | 104 | 41 | 202 | 80 | 20 | 1,398 | 8 |
| Vessels, motor | 3 | | | | 1 | | 42 | |
| Net tonnage | 22 | | | | 9 | | 272 | |
| Boats: | | | | | | | | |
| Motor | 157 | 46 | | 42 | 1 | | 517 | 4 |
| Other | 208 | 18 | 39 | 113 | 76 | 20 | 189 | |

*Fisheries of Louisiana, 1934*—Continued

OPERATING UNITS: By parishes—Continued

| Item | St. Bernard | St. Charles | St. John the Baptist | St. Mary | St. Tammany | Tangipahoa | Terrebonne | Vermilion |
|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Accessory boats | 1 | | | | 1 | | 12 | |
| Apparatus: | | | | | | | | |
| Haul seines | 24 | | 12 | 1 | 2 | | 5 | |
| Length, yards | 4,780 | | 520 | 165 | 166 | | 980 | |
| Trammel nets | 7 | | | | | | 25 | 1 |
| Square yards | 1,330 | | | | | | 4,226 | 160 |
| Lines: | | | | | | | | |
| Hand | 1 | | | 14 | 60 | | 41 | |
| Hooks | 1 | | | 14 | 60 | | 41 | |
| Trot with baits or snoods | 90 | 24 | 2 | 100 | 1 | | 2 | |
| Bait or snoods | 14,800 | 3,600 | 500 | 16,500 | 50 | | 300 | |
| Trots, with hooks | | | 4 | | | | | |
| Hooks | | | 1,800 | | | | | |
| Dip nets: | | | | | | | | |
| Common | 82 | | | | 39 | 13 | | |
| Drop | 3,817 | | | | 1,730 | 455 | | |
| Cast nets | | | | | | 20 | 50 | |
| Otter trawls, shrimp | 116 | 40 | | 20 | | | 528 | |
| Yards at mouth | 1,424 | 457 | | 232 | | | 6,281 | |
| Dredges, oyster | 2 | | | | | | | 4 |
| Yards at mouth | 2 | | | | | | | 5 |
| Tongs, oyster | 1 | | | 49 | 3 | | 319 | |

CATCH: By parishes

| Species | Calcasieu | | Cameron | | Iberia | | Jefferson Davis | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 500 | $15 | | | 1,600 | $66 | | |
| Croaker | 500 | 27 | | | 1,800 | 91 | | |
| Drum: | | | | | | | | |
| Black | | | | | 2,200 | 110 | | |
| Red or redfish | 800 | 49 | | | 6,400 | 384 | | |
| Sheepshead | 300 | 14 | | | 1,600 | 78 | | |
| Squeteagues or "sea trout", spotted | 2,100 | 164 | | | 7,200 | 577 | 6,400 | $512 |
| Crabs, hard | 4,900 | 178 | | | | | | |
| Shrimp | | | 60,100 | $1,804 | 24,200 | 723 | 12,000 | 360 |
| Oysters: | | | | | | | | |
| Market, private, spring | | | | | 8,500 | 851 | | |
| Market, private, fall | | | | | 2,700 | 286 | | |
| Total | 9,100 | 447 | 60,100 | 1,804 | 56,200 | 3,166 | 18,400 | 872 |

| Species | Jefferson | | La Fourche | | Orleans | | Plaquemines | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 8,400 | $290 | 1,200 | $37 | 67,300 | $2,323 | 39,500 | $1,357 |
| Crevalle | | | | | | | 1,100 | 35 |
| Croaker | 8,900 | 414 | 1,600 | 63 | 110,100 | 5,452 | 70,500 | 3,290 |
| Drum: | | | | | | | | |
| Black | 7,700 | 276 | 1,500 | 59 | 54,800 | 1,954 | 52,800 | 1,883 |
| Red or redfish | 16,800 | 977 | 1,900 | 116 | 69,400 | 4,164 | 118,000 | 6,695 |
| Flounders | 3,600 | 291 | 1,400 | 109 | 900 | 73 | 5,100 | 386 |
| Garfish | | | 500 | 2 | | | | |
| Groupers | | | | | 18,400 | 770 | | |
| Jewfish | | | | | 3,400 | 93 | 1,600 | 47 |
| Kingfish or "king mackerel" | | | | | | | 3,600 | 108 |
| Mullet | | | | | 14,900 | 220 | | |
| Sheepshead | 11,400 | 612 | 1,800 | 109 | 139,300 | 7,641 | 51,000 | 2,810 |
| Snapper, red | | | | | 79,000 | 4,550 | | |
| Spanish mackerel | 400 | 21 | | | | | 1,500 | 75 |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 35,700 | 2,936 | 3,200 | 259 | 318,300 | 25,414 | 214,600 | 17,165 |
| White | 9,600 | 259 | 1,600 | 33 | 219,500 | 5,696 | 63,600 | 1,388 |
| Tripletail | 200 | 4 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | 5,416,700 | 53,183 | | | 1,647,500 | 47,118 | 108,000 | 960 |
| Soft | 520,100 | 65,700 | | | 26,700 | 4,199 | | |
| Shrimp | 14,051,700 | 363,922 | 10,475,500 | 271,506 | 1,084,000 | 26,317 | 5,991,500 | 154,159 |
| Oysters: | | | | | | | | |
| Market, public, spring | 218,500 | 13,309 | 284,500 | 16,255 | 375,400 | 39,373 | 145,600 | 8,323 |
| Market, public, fall | 25,300 | 2,218 | | | 227,800 | 29,887 | | |
| Market, private, spring | 25,300 | 1,990 | 383,000 | 29,783 | 12,000 | 700 | 870,900 | 50,650 |
| Market, private, fall | 25,800 | 2,066 | 380,700 | 30,461 | 16,500 | 1,098 | 1,195,300 | 80,667 |
| Turtles, loggerhead | | | | | 3,500 | 70 | | |
| Total | 20,386,100 | 508,468 | 11,538,400 | 348,792 | 4,488,700 | 207,112 | 8,934,200 | 329,998 |

*Fisheries of Louisiana, 1934*—Continued

CATCH: BY PARISHES—Continued

| Species | St. Bernard | | St. Charles | | St. John the Baptist | | St. Mary | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 27,000 | $917 | | | | | 2,900 | $112 |
| Croaker | 62,400 | 3,022 | | | 4,000 | $480 | 7,900 | 330 |
| Drum: | | | | | | | | |
| Black | 33,400 | 1,160 | | | | | 5,100 | 198 |
| Red or redfish | 63,400 | 3,759 | | | 900 | 109 | 19,100 | 982 |
| Flounders | 1,400 | 95 | | | | | | |
| Mullet | 800 | 12 | | | | | | |
| Sheepshead | 27,900 | 1,556 | | | | | 4,100 | 190 |
| Spot | 700 | 17 | | | | | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 165,200 | 12,985 | | | 4,000 | 500 | 25,700 | 2,060 |
| White | 89,600 | 1,931 | | | | | | |
| Crabs: | | | | | | | | |
| Hard | 2,315,400 | 34,373 | 288,000 | $4,320 | 13,300 | 362 | 1,602,100 | 16,374 |
| Soft | 23,400 | 3,690 | | | | | | |
| Shrimp | 5,034,900 | 130,561 | 1,257,600 | 37,609 | 19,700 | 788 | 559,600 | 14,511 |
| Oysters: | | | | | | | | |
| Market, public, spring | 18,200 | 1,656 | | | | | | |
| Market, public, fall | 21,100 | 1,690 | | | | | | |
| Market, private, spring | | | | | | | 89,800 | 6,980 |
| Market, private, fall | | | | | | | 90,600 | 7,247 |
| Total | 7,884,800 | 197,424 | 1,545,600 | 41,929 | 41,900 | 2,239 | 2,406,900 | 48,984 |

| Species | St. Tammany | | Tangipahoa | | Terrebonne | | Vermilion | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | | | | | 47,600 | $1,722 | 1,000 | $31 |
| Croaker | 7,600 | $756 | | | 24,400 | 1,206 | 1,200 | 46 |
| Drum: | | | | | | | | |
| Black | | | | | 39,400 | 1,406 | 1,600 | 82 |
| Red or redfish | 5,100 | 307 | | | 188,100 | 10,500 | 2,600 | 158 |
| Flounders | | | | | 11,900 | 941 | | |
| Kingfish or "king mackerel" | | | | | 9,800 | 337 | | |
| Mullet | | | | | 2,300 | 46 | | |
| Sheepshead | | | | | 29,200 | 1,500 | 900 | 46 |
| Spot | | | | | 1,200 | 50 | | |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 70,300 | 6,406 | | | 217,200 | 17,816 | 3,100 | 252 |
| White | | | | | 61,000 | 1,731 | | |
| Crabs: | | | | | | | | |
| Hard | 145,100 | 4,324 | 77,000 | $2,100 | 58,500 | 650 | | |
| Soft | 43,900 | 6,130 | 37,100 | 5,850 | | | | |
| Shrimp | | | 20,400 | 816 | 16,981,100 | 439,294 | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 1,500 | 400 | | | | | | |
| Market, public, fall | 2,200 | 410 | | | | | | |
| Market, private, spring | | | | | 576,800 | 40,986 | 6,400 | 640 |
| Market, private, fall | | | | | 584,700 | 46,117 | 2,600 | 272 |
| Total | 275,700 | 18,733 | 134,500 | 8,766 | 18,833,200 | 564,302 | 19,400 | 1,527 |

## TEXAS

*Fisheries of Texas, 1934*

OPERATING UNITS: By gear

| Item | Haul seines | Gill nets | | Trammel nets | Lines | | | |
|---|---|---|---|---|---|---|---|---|
| | | Runaround | Stake | | Hand | Troll | Trot with baits or snoods | Trot with hooks |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | 54 | | | |
| On boats and shore: | | | | | | | | |
| Regular | 2 | 39 | 143 | 148 | 102 | | | 80 |
| Casual | 47 | | 1 | 25 | 200 | 17 | 36 | 11 |
| Total | 49 | 39 | 144 | 173 | 356 | 17 | 36 | 91 |
| Vessels, motor | | | | | 9 | | | |
| Net tonnage | | | | | 136 | | | |
| Boats: | | | | | | | | |
| Motor | | 16 | 31 | 69 | 69 | 10 | | 30 |
| Other | 3 | 3 | 33 | 15 | 136 | | 36 | 39 |
| Apparatus: | | | | | | | | |
| Number | 23 | 84 | 215 | 85 | 356 | 17 | 36 | 68 |
| Length, yards | 2,500 | | | | | | | |
| Square yards | | 18,344 | 53,662 | 40,240 | | | | |
| Hooks, baits, or snoods | | | | | 356 | 17 | 13,200 | 52,150 |

| Item | Dip nets | Cast nets | Otter trawls, shrimp | Spears | Dredges, oyster | Tongs, oyster | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | 57 | | 20 | | 114 |
| On boats and shore: | | | | | | | |
| Regular | | | 591 | | 121 | 86 | 1,068 |
| Casual | 6 | 1 | | 105 | | 110 | 459 |
| Total | 6 | 1 | 648 | 105 | 141 | 196 | 1,641 |
| Vessels, motor | | | 27 | | 6 | | 35 |
| Net tonnage | | | 232 | | 54 | | 345 |
| Boats: | | | | | | | |
| Motor | | | 292 | | 41 | 9 | 462 |
| Other | 6 | 1 | | 21 | | 99 | 345 |
| Apparatus: | | | | | | | |
| Number | 6 | 1 | 319 | 105 | 48 | 196 | |
| Yards at mouth | | | 5,066 | | 53 | | |

CATCH: By gear

| Species | Haul seines | | Gill nets | | | | Trammel nets | |
|---|---|---|---|---|---|---|---|---|
| | | | Runaround | | Stake | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 1,500 | $30 | 4,200 | $106 | 11,200 | $279 | 22,900 | $635 |
| Croaker | 7,700 | 228 | 14,400 | 484 | 39,000 | 1,286 | 148,400 | 4,625 |
| Drum: | | | | | | | | |
| Black | 26,400 | 716 | 373,600 | 9,527 | 1,124,000 | 28,387 | 172,400 | 5,065 |
| Red or redfish | 39,500 | 2,366 | 119,400 | 7,172 | 335,400 | 20,123 | 692,700 | 42,254 |
| Flounders | 5,600 | 465 | 4,500 | 370 | 4,300 | 378 | 27,500 | 2,457 |
| Mullet | 39,100 | 782 | | | | | | |
| Pompano | | | | | | | 900 | 162 |
| Sheepshead, salt water | 9,400 | 302 | 13,800 | 478 | 34,400 | 1,548 | 140,200 | 4,384 |
| Snook or sergeantfish | | | | | | | 4,800 | 429 |
| Spanish mackerel | 6,800 | 410 | 12,700 | 833 | 15,100 | 1,057 | 52,500 | 3,191 |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 63,100 | 4,606 | 199,600 | 14,194 | 594,500 | 42,196 | 949,600 | 71,383 |
| White | 3,600 | 77 | 5,900 | 137 | 13,800 | 328 | 63,800 | 1,817 |
| Total | 202,700 | 9,982 | 748,100 | 33,301 | 2,171,700 | 95,582 | 2,275,700 | 136,402 |

*Fisheries of Texas, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Lines | | | | | | | | Dip nets | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hand | | Troll | | Trot with baits or snoods | | Trot with hooks | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 10,100 | $280 | | | | | 13,200 | $382 | | |
| Croaker | 50,500 | 1,591 | | | | | 36,100 | 1,119 | | |
| Drum: | | | | | | | | | | |
| Black | 281,500 | 7,745 | | | | | 274,800 | 8,208 | | |
| Red or redfish | 210,800 | 12,644 | | | | | 181,300 | 10,874 | | |
| Flounders | 15,500 | 1,299 | | | | | 2,100 | 176 | | |
| Groupers | 3,700 | 80 | | | | | | | | |
| Jewfish | 28,300 | 695 | | | | | | | | |
| Kingfish or "king mackerel" | | | 9,600 | $384 | | | | | | |
| Pompano | 1,500 | 165 | | | | | | | | |
| Sheepshead, salt water | 50,700 | 1,602 | | | | | 42,300 | 1,471 | | |
| Snapper, red | 635,400 | 36,092 | | | | | | | | |
| Snook or sergeantfish | 1,700 | 136 | | | | | | | | |
| Spanish mackerel | 53,000 | 3,436 | 25,200 | 1,512 | | | 8,300 | 562 | | |
| Squeteagues or "sea trout": | | | | | | | | | | |
| Spotted | 336,700 | 24,973 | | | | | 208,200 | 16,061 | | |
| White | 14,300 | 371 | | | | | 8,800 | 221 | | |
| Crabs, hard | | | | | 204,300 | $10,748 | | | 53,800 | $1,956 |
| Total | 1,693,700 | 91,109 | 34,800 | 1,896 | 204,300 | 10,748 | 775,100 | 39,074 | 53,800 | 1,956 |

| Species | Cast nets | | Otter trawls | | Spears | | Dredges | | Tongs | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders | | | | | 38,200 | $3,324 | | | | |
| Mullet | 500 | $10 | | | | | | | | |
| Shrimp | | | 16,358,600 | $383,054 | | | | | | |
| Oysters: | | | | | | | | | | |
| Market, public, spring | | | | | | | 301,200 | $26,903 | 388,500 | $27,181 |
| Market, public, fall | | | | | | | 244,500 | 21,324 | 377,600 | 29,796 |
| Total | 500 | 10 | 16,358,600 | 383,054 | 38,200 | 3,324 | 545,700 | 48,227 | 766,100 | 56,977 |

OPERATING UNITS: BY COUNTIES

| Item | Aransas | Brazoria | Calhoun | Cameron | Galveston | Harris |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 4 | | 12 | 5 | 55 | |
| On boats and shore: | | | | | | |
| Regular | 100 | 9 | 189 | 121 | 196 | 16 |
| Casual | 20 | 25 | 5 | 28 | 104 | 31 |
| Total | 124 | 34 | 206 | 154 | 355 | 47 |
| Vessels, motor | 2 | | 4 | 1 | 11 | |
| Net tonnage | 19 | | 26 | 6 | 157 | |
| Boats: | | | | | | |
| Motor | 42 | 12 | 88 | 34 | 89 | 2 |
| Other | 22 | 10 | 4 | 39 | 51 | 30 |
| Apparatus: | | | | | | |
| Haul seines | | | | 1 | 14 | |
| Length, yards | | | | 100 | 1,600 | |
| Gill nets: | | | | | | |
| Runaround | 24 | | | 29 | | |
| Square yards | 4,008 | | | 9,686 | | |
| Stake | 45 | | | 99 | | |
| Square yards | 7,470 | | | 33,066 | | |
| Trammel nets | 12 | 1 | 29 | | 12 | 10 |
| Square yards | 6,384 | 533 | 14,652 | | 5,365 | 2,666 |
| Lines: | | | | | | |
| Hand | 22 | 10 | 14 | 38 | 88 | 5 |
| Hooks | 22 | 10 | 14 | 38 | 88 | 5 |
| Troll | | 10 | | 7 | | |
| Hooks | | 10 | | 7 | | |
| Trot with baits or snoods | | | | | 17 | 12 |
| Baits or snoods | | | | | 6,400 | 4,000 |
| Trot with hooks | 4 | 3 | 1 | | | |
| Hooks | 1,400 | 900 | 1,500 | | | |

*Fisheries of Texas, 1934*—Continued

OPERATING UNITS: BY COUNTIES—Continued

| Item | Aransas | Brazoria | Calhoun | Cameron | Galveston | Harris |
|---|---|---|---|---|---|---|
| Apparatus—Continued. | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Dip nets | 6 | | | | | |
| Otter trawls, shrimp | 25 | 2 | 60 | 13 | 83 | 1 |
| Yards at mouth | 385 | 27 | 950 | 205 | 1,405 | 12 |
| Spears | | 4 | | 6 | 7 | |
| Dredges, oyster | 14 | | 20 | | 1 | 1 |
| Yards at mouth | 16 | | 22 | | 1 | 1 |
| Tongs, oyster | 12 | 10 | 8 | 28 | 42 | 11 |

| Item | Jefferson | Kleberg | Matagorda | Nueces | Refugio | San Patricio |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | 15 | 7 | | 16 |
| On boats and shore: | | | | | | |
| Regular | | 26 | 140 | 147 | | 124 |
| Casual | 7 | | 41 | 149 | 8 | 41 |
| Total | 7 | 26 | 196 | 303 | 8 | 181 |
| Vessels, motor | | | 6 | 3 | | 8 |
| Net tonnage | | | 50 | 27 | | 60 |
| Boats: | | | | | | |
| Motor | | 5 | 58 | 66 | | 66 |
| Other | 7 | 21 | 31 | 90 | 9 | 32 |
| Apparatus: | | | | | | |
| Haul seines | | | | 8 | | |
| Length, yards | | | | 800 | | |
| Gill nets: | | | | | | |
| Runaround | | | | 31 | | |
| Square yards | | | | 4,650 | | |
| Stake | | | | 62 | | 9 |
| Square yards | | | | 11,558 | | 1,568 |
| Trammel nets | | | 11 | | | 10 |
| Square yards | | | 5,320 | | | 5,320 |
| Lines: | | | | | | |
| Hand | 7 | 18 | 1 | 109 | | 44 |
| Hooks | 7 | 18 | 1 | 109 | | 44 |
| Trot with baits or snoods | 7 | | | | | |
| Baits or snoods | 2,800 | | | | | |
| Trot with hooks | | 26 | 2 | 19 | 8 | 5 |
| Hooks | | 26,000 | 700 | 19,350 | 1,600 | 700 |
| Cast nets | | | | 1 | | |
| Otter trawls, shrimp | | | 49 | 32 | | 54 |
| Yards at mouth | | | 744 | 486 | | 852 |
| Spears | | | 15 | 68 | | 5 |
| Dredges, oyster | | | 10 | 2 | | |
| Yards at mouth | | | 11 | 2 | | |
| Tongs, oyster | | | 56 | 15 | 6 | 8 |

CATCH: BY COUNTIES

| Species | Aransas | | Brazoria | | Calhoun | | Cameron | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | 9,700 | $244 | | | 18,000 | $503 | 6,400 | $155 |
| Croaker | 34,100 | 1,260 | 800 | $23 | 84,800 | 2,543 | 14,600 | 365 |
| Drum: | | | | | | | | |
| Black | 73,000 | 1,897 | 1,400 | 42 | 39,500 | 1,180 | 1,530,000 | 38,252 |
| Red or redfish | 97,400 | 5,844 | 78,300 | 4,696 | 328,200 | 19,695 | 349,700 | 20,986 |
| Flounders | 4,900 | 389 | 1,000 | 112 | 12,700 | 1,199 | 11,000 | 885 |
| Groupers | | | | | | | 1,200 | 30 |
| Jewfish | | | | | | | 5,000 | 200 |
| Kingfish or "king mackerel" | | | 6,400 | 256 | | | 3,200 | 128 |
| Sheepshead, salt water | 39,000 | 1,558 | 1,100 | 33 | 72,100 | 2,159 | 10,800 | 667 |
| Snapper, red | | | 6,300 | 410 | | | 53,400 | 3,474 |
| Spanish mackerel | 29,100 | 2,133 | 20,100 | 1,206 | 41,700 | 2,270 | 11,900 | 778 |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 185,000 | 12,952 | 82,600 | 6,614 | 326,200 | 24,063 | 643,100 | 45,018 |
| White | 14,600 | 365 | 500 | 14 | 40,200 | 1,154 | 5,400 | 131 |
| Crabs, hard | 53,800 | 1,956 | | | | | | |
| Shrimp | 1,258,100 | 29,441 | 82,900 | 1,941 | 3,042,300 | 71,192 | 662,300 | 15,756 |
| Oysters: | | | | | | | | |
| Market, public, spring | 103,600 | 8,174 | 8,600 | 600 | 131,700 | 9,860 | 12,600 | 875 |
| Market, public, fall | 83,300 | 6,613 | 8,300 | 640 | 143,000 | 11,046 | 13,700 | 980 |
| Total | 1,985,600 | 72,826 | 298,300 | 16,587 | 4,280,400 | 146,864 | 3,334,300 | 128,680 |

*Fisheries of Texas, 1934*—Continued

CATCH: BY COUNTIES—Continued

| Species | Galveston | | Harris | | Jefferson | | Kleberg | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | | | | | | | 12,100 | $364 |
| Croaker | 40,000 | $1,198 | | | 2,800 | $84 | 16,100 | 485 |
| Drum: | | | | | | | | |
| Black | 27,000 | 821 | | | 6,200 | 186 | 274,600 | 8,240 |
| Red or redfish | 171,600 | 10,368 | 62,100 | $4,347 | 13,400 | 804 | 36,400 | 2,181 |
| Flounders | 10,800 | 1,003 | 1,500 | 150 | | | 4,200 | 375 |
| Groupers | 2,500 | 50 | | | | | | |
| Jewfish | 3,100 | 93 | | | | | | |
| Mullet | 39,100 | 782 | | | | | | |
| Sheepshead, salt water | 59,400 | 1,801 | | | | | | |
| Snapper, red | 575,700 | 32,208 | | | 2,200 | 66 | 20,200 | 808 |
| Spanish mackerel | 9,100 | 636 | | | | | | |
| Squeteagues or "sea trout": | | | | | | | 8,300 | 593 |
| Spotted | 348,700 | 26,199 | 77,300 | 6,648 | 15,600 | 1,248 | 32,400 | 2,585 |
| White | 17,900 | 537 | | | 900 | 27 | | |
| Crabs, hard | 87,900 | 4,700 | 83,100 | 4,536 | 33,300 | 1,512 | | |
| Shrimp | 4,531,800 | 106,043 | 37,700 | 882 | | | | |
| Oysters: | | | | | | | | |
| Market, public, spring | 130,000 | 9,317 | 37,500 | 2,600 | | | | |
| Market, public, fall | 106,500 | 9,416 | 33,700 | 2,760 | | | | |
| Total | 6,161,100 | 205,172 | 332,900 | 21,923 | 74,400 | 3,927 | 404,300 | 15,631 |

| Species | Matagorda | | Nueces | | Refugio | | San Patricio | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Catfish and bullheads | | | 7,700 | $183 | | | 9,200 | $263 |
| Croaker | 17,700 | $533 | 35,500 | 1,063 | 1,000 | $31 | 48,700 | 1,748 |
| Drum: | | | | | | | | |
| Black | 80,400 | 2,411 | 151,100 | 4,533 | | | 69,500 | 2,086 |
| Red or redfish | 164,600 | 9,875 | 173,700 | 10,413 | 9,100 | 544 | 94,600 | 5,680 |
| Flounders | 4,100 | 457 | 27,400 | 2,205 | | | 20,100 | 1,694 |
| Jewfish | | | 15,100 | 302 | | | 5,100 | 100 |
| Mullet | | | 500 | 10 | | | | |
| Pompano | 900 | 162 | 1,200 | 132 | | | 300 | 33 |
| Sheepshead, salt water | 15,500 | 468 | 30,600 | 922 | 1,400 | 43 | 38,500 | 1,260 |
| Snook or sergeantfish | | | 1,700 | 136 | | | 4,800 | 429 |
| Spanish mackerel | | | 30,600 | 1,789 | | | 22,800 | 1,596 |
| Squeteagues or "sea trout": | | | | | | | | |
| Spotted | 163,900 | 12,398 | 166,400 | 12,989 | 11,100 | 890 | 299,400 | 21,809 |
| White | 7,200 | 193 | 15,400 | 306 | | | 8,100 | 224 |
| Shrimp | 2,406,900 | 56,325 | 1,556,700 | 36,428 | | | 2,779,900 | 65,046 |
| Oysters: | | | | | | | | |
| Market, public, spring | 212,600 | 18,844 | 25,700 | 1,913 | 10,000 | 695 | 17,400 | 1,206 |
| Market, public, fall | 175,300 | 15,121 | 26,500 | 2,120 | 5,600 | 404 | 26,200 | 2,020 |
| Total | 3,249,100 | 116,787 | 2,265,800 | 75,444 | 38,200 | 2,607 | 3,444,600 | 105,194 |

## FISHERIES OF THE PACIFIC COAST STATES [11]

The yield of the commercial fisheries of the Pacific Coast States (Washington, Oregon, and California) during 1934 amounted to 1,546,102,000 pounds, valued at $19,950,059 to the fishermen, representing an increase of 80 percent in volume and 43 percent in value as compared with the catch in the previous year. These fisheries gave employment to 19,232 fishermen as compared with 18,673 in 1933.

There were 323 fishery wholesale and manufacturing establishments in the three States in 1934 as compared with 313 in 1933.

[11] Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State agencies. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. While statistics of the fisheries of California are for the calendar year, those for Oregon and Washington are for the fiscal year ending Mar. 31, except that statistics of the halibut fishery in these latter States are for the calendar year. For a clearer understanding of the statistics published in this section the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

During 1934 these establishments employed 13,220 persons, paid $7,031,444 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at $41,007,888. In 1933 the wholesale and manufacturing firms employed 11,993 persons, paid $6,095,492 in salaries and wages, and produced manufactured products, valued at $28,772,185.

*Fisheries of the Pacific Coast States, 1934*

SUMMARY OF CATCH

| Product | Washington | | Oregon | |
|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* |
| Fish | 105,726,200 | $5,580,945 | 24,118,500 | $1,343,440 |
| Shellfish, etc | 7,742,400 | 724,182 | 2,339,400 | 113,238 |
| Total | 113,468,600 | 6,305,127 | 26,457,900 | 1,456,678 |

| Product | California | | Total | |
|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* |
| Fish | 1,392,972,100 | $11,365,306 | 1,522,816,800 | $18,289,691 |
| Shellfish, etc | 9,205,000 | 731,368 | 19,286,800 | 1,568,788 |
| Whale products | 3,998,400 | 91,580 | 3,998,400 | 91,580 |
| Total | 1,406,175,500 | 12,188,254 | 1,546,102,000 | 19,950,059 |

OPERATING UNITS: BY STATES

| Item | Washington | | | | Oregon | | |
|---|---|---|---|---|---|---|---|
| | Puget Sound district | Coastal district | Columbia River district | Total | Columbia River district | Coastal district | Total |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 3,118 | 47 | 8 | 3,173 | 39 | 16 | 55 |
| On boats and shore | 1,915 | 3,044 | 1,152 | 6,111 | 2,068 | 1,438 | 3,506 |
| Total | 5,033 | 3,091 | 1,160 | 9,284 | 2,107 | 1,454 | 3,561 |
| Vessels: | | | | | | | |
| Steam | 1 | | | 1 | | | |
| Net tonnage | 23 | | | 23 | | | |
| Motor | 492 | 21 | 2 | 515 | 19 | 8 | 27 |
| Net tonnage | 10,651 | 156 | 34 | 10,841 | 176 | 87 | 263 |
| Sail | 3 | | | 3 | | | |
| Net tonnage | 1,346 | | | 1,346 | | | |
| Total vessels | 496 | 21 | 2 | 519 | 19 | 8 | 27 |
| Total net tonnage | 12,020 | 156 | 34 | 12,210 | 176 | 87 | 263 |
| Boats: | | | | | | | |
| Motor | 854 | 448 | 602 | 1,904 | 1,145 | 954 | 2,099 |
| Other | 328 | 180 | 78 | 586 | 59 | 131 | 190 |
| Accessory boats | 306 | | | 306 | | | |
| Apparatus: | | | | | | | |
| Purse seines, salmon | 227 | | | 227 | | | |
| Length, yards | 135,746 | | | 135,746 | | | |
| Haul, seines | 65 | | 24 | 89 | 33 | 3 | 36 |
| Length, yards | 5,821 | | 7,560 | 13,381 | 17,225 | 466 | 17,691 |
| Gill nets: | | | | | | | |
| Drift | 298 | 126 | 394 | 818 | 871 | 515 | 1,386 |
| Square yards | 390,976 | 225,400 | 1,095,320 | 1,711,696 | 2,754,973 | 630,875 | 3,385,848 |
| Set | 3 | 193 | 96 | 292 | 137 | 795 | 932 |
| Square yards | 810 | 53,259 | 24,384 | 78,453 | 38,497 | 254,400 | 292,897 |
| Lines: | | | | | | | |
| Trawl, set, and hand | 25,557 | | 309 | 25,866 | 434 | 183 | 617 |
| Hooks | 522,714 | | 7,200 | 529,914 | 12,125 | 6,425 | 18,550 |
| Troll | 1,790 | 540 | 60 | 2,390 | 796 | 845 | 1,641 |
| Hooks | 8,055 | 2,430 | 240 | 10,725 | 3,582 | 3,802 | 7,384 |
| Pound nets | 112 | 99 | 211 | 422 | 27 | | 27 |
| Brush weirs | 5 | | | 5 | | | |
| Fish wheels | | | 27 | 27 | | | |

*Fisheries of the Pacific Coast States, 1934*—Continued

OPERATING UNITS: By States—Continued

| Item | Washington | | | | Oregon | | |
|---|---|---|---|---|---|---|---|
| | Puget Sound district | Coastal district | Columbia River district | Total | Columbia River district | Coastal district | Total |
| Apparatus—Continued. | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Dip nets | 9 | 41 | 178 | 228 | 133 | | 133 |
| Drag bag nets | 37 | 6 | | 43 | | | |
| Length, yards | 2,959 | 390 | | 3,349 | | | |
| Reef nets | 6 | | | 6 | | | |
| Beam trawls | 8 | | | 8 | | | |
| Yards at mouth | 42 | | | 42 | | | |
| Otter trawls | 25 | | | 25 | | 1 | 1 |
| Yards at mouth | 304 | | | 304 | | 20 | 20 |
| Traps: | | | | | | | |
| Crab | 2,576 | 2,605 | | 5,181 | | 8,760 | 8,760 |
| Crawfish | | | | | 1,920 | | 1,920 |
| Tongs, rakes, and shovels | 552 | 2,539 | | 3,091 | | 149 | 149 |
| Dredges, oyster | | 4 | | 4 | | | |
| Yards at mouth | | 6 | | 6 | | | |

| Item | California | | | | | | Grand total |
|---|---|---|---|---|---|---|---|
| | Northern district | San Francisco district | Monterey district | San Pedro district | San Diego district | Total | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 34 | 603 | 648 | 1,725 | 676 | 3,686 | 6,914 |
| On boats and shore | 271 | 937 | 556 | 723 | 214 | 2,701 | 12,318 |
| Total | 305 | 1,540 | 1,204 | 2,448 | 890 | 6,387 | 19,232 |
| Vessels: | | | | | | | |
| Steam | | 2 | | | | 2 | 3 |
| Net tonnage | | 41 | | | | 41 | 64 |
| Motor | 14 | 61 | 67 | 186 | 76 | 404 | 946 |
| Net tonnage | 121 | 1,761 | 1,878 | 7,155 | 4,296 | 15,211 | 26,315 |
| Sail | | 2 | | | | 2 | 5 |
| Net tonnage | | 824 | | | | 824 | 2,170 |
| Total vessels | 14 | 65 | 67 | 186 | 76 | 408 | 954 |
| Total net tonnage | 121 | 2,626 | 1,878 | 7,155 | 4,296 | 16,076 | 28,549 |
| Boats: | | | | | | | |
| Motor | 202 | 585 | 217 | 349 | 109 | 1,462 | 5,465 |
| Other | 1 | 38 | 38 | 50 | 5 | 132 | 908 |
| Accessory boats | | 78 | 89 | 205 | 72 | 444 | 750 |
| Apparatus: | | | | | | | |
| Purse seines: | | | | | | | |
| Mackerel | | | | 17 | | 17 | 17 |
| Length, yards | | | | 6,707 | | 6,707 | 6,707 |
| Salmon | | | | | | | 227 |
| Length, yards | | | | | | | 135,746 |
| Sardine | | 33 | 42 | 71 | | 146 | 146 |
| Length, yards | | 11,187 | 13,850 | 27,187 | | 52,224 | 52,224 |
| Tuna | | | | 66 | | 66 | 66 |
| Length, yards | | | | 38,212 | | 38,212 | 38,212 |
| Lampara nets: | | | | | | | |
| Mackerel | | | | 62 | 16 | 78 | 78 |
| Length, yards | | | | 24,686 | 4,813 | 29,499 | 29,499 |
| Sardine | | 20 | 32 | 43 | 8 | 103 | 103 |
| Length, yards | | 5,550 | 8,840 | 18,282 | 2,320 | 34,992 | 34,992 |
| Other | | | 23 | 9 | | 32 | 32 |
| Length, yards | | | 4,025 | 3,240 | | 7,265 | 7,265 |
| Haul seines | | 6 | | | | 6 | 131 |
| Length, yards | | 770 | | | | 770 | 31,842 |
| Gill nets: | | | | | | | |
| Drift: | | | | | | | |
| Barracuda | | | | 18 | 16 | 34 | 34 |
| Square yards | | | | 201,546 | 126,800 | 328,346 | 328,346 |
| Salmon | | 155 | | | | 155 | 2,359 |
| Square yards | | 534,750 | | | | 534,750 | 5,632,294 |
| Shad | | 191 | | | | 191 | 191 |
| Square yards | | 673,275 | | | | 673,275 | 673,275 |

*Fisheries of the Pacific Coast States, 1934*—Continued

OPERATING UNITS: By States—Continued

| Item | California | | | | | | Grand total |
|---|---|---|---|---|---|---|---|
| | Northern district | San Francisco district | Monterey district | San Pedro district | San Diego district | Total | |
| Apparatus—Continued. | | | | | | | |
| Gill nets—Continued. | | | | | | | |
| Set: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| "California halibut" | | | 8 | | | 8 | 8 |
| Square yards | | | 37,826 | | | 37,826 | 37,826 |
| Salmon | | | | | | | 1,224 |
| Square yards | | | | | | | 371,350 |
| Sea bass | | | | 32 | 14 | 46 | 46 |
| Square yards | | | | 155,936 | 69,230 | 225,166 | 225,166 |
| Miscellaneous | 16 | 55 | 59 | 23 | 9 | 162 | 162 |
| Square yards | 12,000 | 64,543 | 86,065 | 14,522 | 14,360 | 191,490 | 191,490 |
| Trammel nets | | | | 36 | 12 | 48 | 48 |
| Square yards | | | | 188,784 | 121,120 | 309,904 | 309,904 |
| Lines: | | | | | | | |
| Trawl, set, and hand | 497 | 1,150 | 853 | 1,592 | 907 | 4,999 | 31,482 |
| Hooks | 88,086 | 63,032 | 87,646 | 289,456 | 45,620 | 573,840 | 1,122,304 |
| Troll | 1,006 | 870 | 467 | 724 | 234 | 3,301 | 7,332 |
| Hooks | 4,604 | 5,315 | 2,672 | 724 | 234 | 13,549 | 31,658 |
| Pound nets | | | | | | | 449 |
| Brush weirs | | | | | | | 5 |
| Fish wheels | | | | | | | 27 |
| Fyke nets | | 2,075 | | | | 2,075 | 2,075 |
| Dip nets | 30 | 3 | | | | 33 | 394 |
| Bag nets, shrimp | | 11 | | | | 11 | 11 |
| Length, yards | | 7,312 | | | | 7,312 | 7,312 |
| Drag bag nets | | | | | | | 43 |
| Length, yards | | | | | | | 3,349 |
| Reef nets | | | | | | | 6 |
| Paranzella nets | | 9 | 2 | 4 | | 15 | 15 |
| Yards at mouth | | 150 | 33 | 67 | | 250 | 250 |
| Beam trawls | | 19 | | | | 19 | 27 |
| Yards at mouth | | 127 | | | | 127 | 169 |
| Otter trawls | | | | | | | 26 |
| Yards at mouth | | | | | | | 324 |
| Traps: | | | | | | | |
| Crab | 579 | 5,226 | 112 | | | 5,917 | 19,858 |
| Crawfish | | | | | | | 1,920 |
| Lobster | | | | 5,172 | 1,348 | 6,520 | 6,520 |
| Octopus | | | 6 | | | 6 | 6 |
| Harpoons: | | | | | | | |
| Swordfish and turtles | | | | 37 | 14 | 51 | 51 |
| Whales | | 2 | | | | 2 | 2 |
| Tongs, rakes, and shovels | 14 | 102 | 37 | 64 | | 217 | 3,457 |
| Abalone outfits | | | 17 | 2 | | 19 | 19 |
| Dredges, oyster | | | | | | | 4 |
| Yards at mouth | | | | | | | 6 |

CATCH: By States

| Species | Washington | | Oregon | |
|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* |
| Carp | 99,600 | $2,988 | 6,000 | $180 |
| Cod [2] | 10,403,900 | 145,134 | | |
| Flounders: | | | | |
| "Sole" | 961,700 | 32,493 | 22,800 | 919 |
| Other | 56,500 | 1,220 | 48,300 | 732 |
| Halibut | 23,276,000 | 1,677,761 | 500,900 | 38,198 |
| Herring | 242,000 | 1,531 | 37,400 | 416 |
| "Lingcod" | 1,105,600 | 35,603 | 129,700 | 3,658 |
| Perch | 62,000 | 1,681 | 8,700 | 146 |
| Rockfishes | 566,400 | 20,041 | 52,900 | 1,494 |
| Sablefish | 2,242,800 | 85,286 | 102,400 | 2,991 |
| Salmon: | | | | |
| Blueback, red or sockeye | 24,089,600 | 1,543,642 | 207,000 | 20,700 |
| Chinook or king | 17,002,600 | 1,190,739 | 12,110,000 | 825,416 |
| Chum or keta | 9,723,600 | 210,101 | 972,100 | 11,528 |
| Humpback or pink | 190,500 | 5,715 | | |
| Silver or coho | 11,557,600 | 504,650 | 6,918,400 | 309,098 |
| Shad | 171,100 | 5,133 | 905,200 | 24,032 |
| Smelt | 2,572,400 | 39,161 | 564,200 | 14,112 |
| Steelhead trout | 1,371,300 | 77,188 | 1,458,900 | 86,959 |
| Striped bass | | | 23,700 | 1,405 |
| Sturgeon | 31,000 | 878 | 48,900 | 1,344 |
| Tuna and tunalike fishes, albacore | | | 1,000 | 112 |
| Total | 105,726,200 | 5,580,945 | 24,118,500 | 1,343,440 |

[2] The cod were taken off Alaska.

*Fisheries of the Pacific Coast States, 1934*—Continued

CATCH: BY STATES—Continued

| Species | Washington | | Oregon | |
|---|---|---|---|---|
| SHELLFISH, ETC. | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs | 1,124,900 | $63,824 | 2,086,400 | $85,352 |
| Crawfish | | | 143,600 | 14,360 |
| Shrimp | 59,900 | 4,193 | | |
| Clams: | | | | |
| Hard | 683,000 | 36,282 | | |
| Razor | 547,800 | 78,260 | 38,600 | 5,521 |
| Mixed | | | 38,500 | 1,907 |
| Octopus | 65,700 | 2,193 | | |
| Oysters: | | | | |
| Eastern, market | 500 | 175 | | |
| Japanese, market | 4,925,100 | 356,059 | 24,500 | 1,741 |
| Native, market | 317,700 | 179,949 | 7,800 | 4,357 |
| Scallops, bay | 12,200 | 3,051 | | |
| Squid | 5,600 | 196 | | |
| Total | 7,742,400 | 724,182 | 2,339,400 | 113,238 |
| Grand total | 113,468,600 | 6,305,127 | 26,457,900 | 1,456,678 |

| Species | California [1] | | Total | |
|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* |
| Anchovies | 257,500 | $3,722 | 257,500 | $3,722 |
| Barracuda | 2,182,800 | 94,859 | 2,182,800 | 94,859 |
| Cabrilla | 331,700 | 13,528 | 331,700 | 13,528 |
| Carp | 158,000 | 2,140 | 263,600 | 5,308 |
| Catfish | 184,900 | 22,647 | 184,900 | 22,647 |
| Cod [2] | 6,036,400 | 76,100 | 16,440,300 | 221,234 |
| Corbina | 1,000 | 62 | 1,000 | 62 |
| Flounders: | | | | |
| "California halibut" | 1,037,000 | 81,109 | 1,037,000 | 81,109 |
| "Sole" | 8,967,600 | 450,840 | 9,952,100 | 484,252 |
| Other | 1,376,700 | 56,691 | 1,481,500 | 58,643 |
| Flyingfish | 26,400 | 885 | 26,400 | 885 |
| Grayfish | 526,300 | 12,435 | 526,300 | 12,435 |
| Groupers | 61,400 | 3,076 | 61,400 | 3,076 |
| Hake | 56,900 | 572 | 56,900 | 572 |
| Halibut | 1,023,000 | 64,192 | 24,799,900 | 1,780,151 |
| Hardhead | 147,400 | 6,882 | 147,400 | 6,882 |
| Herring | 801,600 | 4,539 | 1,081,000 | 6,486 |
| Horse mackerel | 1,581,300 | 15,013 | 1,581,300 | 15,013 |
| Kingfish | 634,300 | 14,772 | 634,300 | 14,772 |
| "Lingcod" | 856,600 | 27,799 | 2,091,900 | 67,060 |
| Mackerel | 113,848,500 | 720,128 | 113,848,500 | 720,128 |
| Marlin | 64,800 | 2,799 | 64,800 | 2,799 |
| Mullet | 19,000 | 795 | 19,000 | 795 |
| Perch | 192,700 | 11,912 | 263,400 | 13,739 |
| Pilchard or sardine | 1,135,958,800 | 4,177,728 | 1,135,958,800 | 4,177,728 |
| Pompano | 4,500 | 1,906 | 4,500 | 1,906 |
| Rock bass | 412,400 | 20,697 | 412,400 | 20,697 |
| Rockfishes | 4,608,600 | 162,952 | 5,227,900 | 184,487 |
| Rudderfish | 32,300 | 1,389 | 32,300 | 1,389 |
| Sablefish | 2,105,200 | 56,856 | 4,450,400 | 145,133 |
| Salmon: | | | | |
| Blueback, red or sockeye | | | 24,296,600 | 1,564,342 |
| Chinook or king | 4,319,600 | 329,571 | 33,432,200 | 2,345,726 |
| Chum or keta | | | 10,695,700 | 221,629 |
| Humpback or pink | | | 190,500 | 5,715 |
| Silver or coho | | | 18,476,000 | 813,748 |
| Sculpin | 71,200 | 4,432 | 71,200 | 4,432 |
| Sea bass: | | | | |
| Black | 858,800 | 37,783 | 858,800 | 37,783 |
| White | 851,600 | 56,459 | 851,600 | 56,459 |
| Shad | 872,600 | 28,288 | 1,948,900 | 57,453 |
| Sheepshead | 143,500 | 4,801 | 143,500 | 4,801 |
| Skates | 232,300 | 2,969 | 232,300 | 2,969 |
| Smelt | 730,000 | 30,414 | 3,866,600 | 83,687 |
| Spanish mackerel | 6,900 | 225 | 6,900 | 225 |
| Splittail | 55,000 | 662 | 55,000 | 662 |
| Squawfish | 1,600 | 53 | 1,600 | 53 |
| Steelhead trout | | | 2,830,200 | 164,147 |
| Striped bass | 801,300 | 47,794 | 825,000 | 49,199 |
| Sturgeon | | | 79,900 | 2,222 |
| Suckers | 63,000 | 701 | 63,000 | 701 |
| Swordfish | 264,000 | 37,144 | 264,000 | 37,144 |
| Tomcod | 900 | 18 | 900 | 18 |

[1] Taken off the Pacific coast including Latin America.
[2] The cod were taken off Alaska.

*Fisheries of the Pacific Coast States, 1934*—Continued

CATCH: BY STATES—Continued

| Species | California | | Total | |
|---|---|---|---|---|
| FISH—continued | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* |
| Tuna and tunalike fishes: | | | | |
| Albacore | 119,800 | $9,203 | 120,800 | $9,315 |
| Bluefin | 18,357,800 | 846,082 | 18,357,800 | 846,082 |
| Bonito | 3,202,700 | 76,876 | 3,202,700 | 76,876 |
| Skipjack or striped tuna | 14,830,200 | 593,524 | 14,830,200 | 593,524 |
| Yellowfin | 60,913,200 | 3,053,229 | 60,913,200 | 3,053,229 |
| Whitebait | 106,000 | 5,187 | 106,000 | 5,187 |
| Whitefish | 93,200 | 5,205 | 93,200 | 5,205 |
| Yellowtail | 2,347,200 | 79,388 | 2,347,200 | 79,388 |
| Other fish | 234,100 | 6,273 | 234,100 | 6,273 |
| Total | 1,392,972,100 | 11,365,306 | 1,522,816,800 | 18,289,691 |
| SHELLFISH, ETC. | | | | |
| Crabs | 3,792,700 | 313,237 | 7,004,000 | 462,413 |
| Crawfish | | | 143,600 | 14,360 |
| Sea crawfish or spiny lobster | 1,182,700 | 180,264 | 1,182,700 | 180,264 |
| Shrimp | 1,784,600 | 27,406 | 1,844,500 | 31,599 |
| Abalone | 644,700 | 104,742 | 644,700 | 104,742 |
| Clams: | | | | |
| Hard | 28,600 | 5,452 | 711,600 | 41,734 |
| Pismo | 35,200 | 7,373 | 35,200 | 7,373 |
| Razor | | | 586,400 | 83,781 |
| Soft | 71,100 | 15,639 | 71,100 | 15,639 |
| Mixed | | | 38,500 | 1,907 |
| Octopus | 30,400 | 1,964 | 96,100 | 4,157 |
| Oysters: | | | | |
| Eastern, market | 89,100 | 38,981 | 89,600 | 39,156 |
| Japanese, market | 6,700 | 1,675 | 4,956,300 | 359,475 |
| Native, market | 5,000 | 2,728 | 330,500 | 187,034 |
| Scallops, bay | | | 12,200 | 3,051 |
| Squid | 1,530,500 | 31,722 | 1,536,100 | 31,918 |
| Turtles | 3,700 | 185 | 3,700 | 185 |
| Total | 9,205,000 | 731,368 | 19,286,800 | 1,568,788 |
| WHALE PRODUCTS | | | | |
| Whale meat | 2,044,000 | 40,880 | 2,044,000 | 40,880 |
| Whale oil | 1,954,400 | 50,700 | 1,954,400 | 50,700 |
| Total | 3,998,400 | 91,580 | 3,998,400 | 91,580 |
| Grand total | 1,406,175,500 | 12,188,254 | 1,546,102,000 | 19,950,059 |

*Industries related to the fisheries of the Pacific Coast States, 1934*

OPERATING UNITS, SALARIES, AND WAGES

| Item | Washington | Oregon | California | Total |
|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* |
| Transporting: | | | | |
| Persons engaged | 212 | 48 | 3 | 263 |
| Vessels: | | | | |
| Steam | | | 1 | 1 |
| Net tonnage | | | 32 | 32 |
| Motor | 87 | 24 | | 111 |
| Net tonnage | 2,131 | 299 | | 2,430 |
| Total vessels | 87 | 24 | 1 | 112 |
| Total net tonnage | 2,131 | 299 | 32 | 2,462 |
| Wholesale and manufacturing: | | | | |
| Establishments | 120 | 59 | 144 | 323 |
| Persons engaged: | | | | |
| Proprietors | 90 | 63 | 205 | 358 |
| Salaried employees | 215 | 66 | 535 | 816 |
| Wage earners: | | | | |
| Average for season | 3,871 | 792 | 7,383 | 12,046 |
| Average for year | 1,256 | 386 | 3,417 | 5,059 |
| Paid to salaried employees | $491,405 | $168,098 | $1,529,979 | $2,189,482 |
| Paid to wage earners | $1,234,892 | $463,127 | $3,143,943 | $4,841,962 |
| Total salaries and wages | $1,726,297 | $631,225 | $4,673,922 | $7,031,444 |
| Fishermen manufacturing | 70 | | 125 | 195 |

*Industries related to the fisheries of the Pacific Coast States, 1934*—Continued

PRODUCTS MANUFACTURED

| Item | Washington | | Oregon | | California | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing firms: | | | | | | |
| Barracuda, fresh fillets ..... pounds | | | | | 560,000 | $67,200 |
| Cabrilla, fresh fillets ..... do | | | | | 120,000 | 14,650 |
| Cod, salted: | | | | | | |
| Green, in process, partly boned [1] ..... pounds | 1,904,465 | $129,355 | | | (2) | (2) |
| Boneless, including absolutely boneless ..... pounds | 988,467 | 135,771 | | | (2) | (2) |
| Flounders, fresh fillets ..... do | 122,495 | 13,419 | (2) | (2) | 1,807,500 | 293,875 |
| Grayfish, fresh fillets ..... do | | | | | 130,000 | 13,000 |
| Halibut, frozen steaks ..... do | 117,000 | 16,500 | | | | |
| "Lingcod", fresh fillets ..... do | (2) | (2) | (2) | (2) | 125,000 | 15,000 |
| Mackerel: | | | | | | |
| Canned ..... standard cases | | | | | 1,250,551 | 3,087,804 |
| Meal ..... tons | | | | | 3,323 | 98,392 |
| Oil ..... gallons | | | | | 157,571 | 25,533 |
| Pilchards: | | | | | | |
| Canned "sardines" ..... standard cases | | | | | 1,970,047 | 5,481,391 |
| Meal ..... tons | | | | | 89,280 | 2,878,269 |
| Oil ..... gallons | | | | | 20,845,171 | 4,413,609 |
| Rockfishes, fresh fillets ..... pounds | | | (2) | (2) | 930,000 | 119,150 |
| Sablefish: | | | | | | |
| Fresh fillets ..... do | (2) | (2) | | | 450,000 | 45,000 |
| Salted ..... do | 283,806 | 16,525 | (2) | (2) | (2) | (2) |
| Kippered ..... do | 317,097 | 36,738 | | | (2) | (2) |
| Salmon: | | | | | | |
| Frozen steaks ..... do | 15,100 | 2,229 | | | | |
| Salted: | | | | | | |
| Mild cured [1] ..... do | 3,359,902 | 629,335 | 1,595,625 | $320,502 | 1,340,625 | 275,533 |
| Eggs for caviar ..... do | 158,078 | 20,141 | | | | |
| Kippered ..... do | 1,696,345 | 268,252 | (2) | (2) | | |
| Smoked ..... do | 104,667 | 19,288 | 47,731 | 11,835 | 247,118 | 94,135 |
| Canned: | | | | | | |
| Blueback, red or sockeye ..... standard cases | 355,169 | 3,630,745 | 5,142 | 80,201 | | |
| Chinook or king ..... do | 75,050 | 771,280 | 196,894 | 2,038,422 | | |
| Chum or keta ..... do | 88,250 | 347,697 | 26,423 | 99,799 | | |
| Humpback or pink ..... do | 2,630 | 14,343 | | | | |
| Silver or coho ..... do | 71,867 | 509,178 | 63,699 | 560,586 | | |
| Steelhead trout ..... do | 3,114 | 19,879 | 12,968 | 133,817 | | |
| Eggs for bait ..... do | 4,060 | 106,281 | 984 | 22,172 | | |
| Meal ..... tons | 950 | 23,560 | (2) | (2) | | |
| Oil ..... gallons | 125,984 | 19,147 | 42,754 | 24,458 | | |
| Sea bass: | | | | | | |
| Black, fresh fillets ..... pounds | | | | | 485,000 | 54,000 |
| White, fresh fillets ..... do | | | | | 120,000 | 18,900 |
| Shad: | | | | | | |
| Mild cured ..... do | | | | | 52,800 | 3,200 |
| Canned ..... standard cases | 954 | 2,767 | 7,279 | 21,691 | | |
| Roe, canned ..... do | (2) | (2) | 1,500 | 42,750 | (2) | (2) |
| Sheepshead, fresh fillets ..... pounds | | | | | 44,000 | 6,180 |
| Swordfish, fresh fillets ..... do | | | | | 110,000 | 32,400 |
| Tuna and tunalike fishes: | | | | | | |
| Canned: | | | | | | |
| Albacore ..... standard cases | | | | | 90,599 | 512,319 |
| Bluefin ..... do | | | | | 312,198 | 1,420,733 |
| Bonito ..... do | | | | | 58,083 | 234,598 |
| Striped ..... do | | | | | 226,359 | 1,034,799 |
| "Tonno" ..... do | | | | | 167,484 | 1,082,318 |
| Yellowfin ..... do | | | | | 1,100,772 | 5,680,503 |
| Yellowtail ..... do | | | | | 11,448 | 44,272 |
| Meal ..... tons | | | | | 6,705 | 191,015 |
| Totuava, fresh fillets ..... pounds | | | | | 365,000 | 54,750 |
| Crabs, meat, packaged, fresh cooked ..... pounds | 153,690 | 57,497 | 267,624 | 77,754 | | |
| Lobsters, meat, packaged, fresh cooked ..... pounds | | | | | 860,000 | 221,000 |
| Abalone steaks ..... do | | | | | 627,300 | 183,990 |
| Clams, hard: | | | | | | |
| Fresh shucked ..... gallons | 2,849 | 3,311 | (2) | (2) | | |
| Canned: | | | | | | |
| Whole ..... standard cases | 12,977 | 52,361 | | | | |
| Minced ..... do | 9,685 | 40,542 | | | | |
| Juice ..... do | 2,322 | 4,793 | | | | |
| Shells, crushed for poultry feed ..... tons | 1,735 | 16,662 | | | | |

See footnotes at end of table.

*Industries related to the fisheries of the Pacific Coast States, 1934*—Continued

PRODUCTS MANUFACTURED—Continued

| Item | Washington | | Oregon | | California | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing firms—Continued. | | | | | | |
| Clams, razor: | | | | | | |
| Canned: | | | | | | |
| Whole ... standard cases | 558 | $5,064 | | | | |
| Minced ... do | 23,068 | 198,624 | 654 | $4,617 | | |
| Oysters: | | | | | | |
| Japanese: | | | | | | |
| Fresh shucked ... gallons | 219,637 | 281,782 | 44,966 | 69,594 | (2) | (2) |
| Canned ... standard cases | 68,497 | 317,887 | (2) | (2) | | |
| Native, fresh shucked ... gallons | 23,967 | 137,061 | 7,796 | 47,352 | (2) | (2) |
| Shell products, poultry feed ... tons | (2) | (2) | (2) | (2) | 16,215 | $85,589 |
| Unclassified: | | | | | | |
| Packaged ... pounds | [3] 87,200 | [3] 15,757 | [4] 20,625 | [4] 3,000 | [5] 396,332 | [5] 97,050 |
| Salted ... do | (6) | (6) | (6) | (6) | [7] 1,417,562 | [7] 119,744 |
| Smoked ... do | (6) | (6) | [8] 26,579 | [8] 4,828 | [9] 391,735 | [9] 67,037 |
| Canned, cat and dog food ... standard cases | | | | | 287,752 | 795,590 |
| Canned, other ... do | [10] 1,178 | [10] 5,110 | (6) | (6) | [11] 3,576 | [11] 31,483 |
| Meal and scrap ... tons | (6) | (6) | (6) | (6) | [12] 2,018 | [12] 52,571 |
| Oil ... gallons | (6) | (6) | | | [13] 315,346 | [13] 66,360 |
| Miscellaneous | | [14] 111,887 | | [15] 22,776 | | [16] 428,024 |
| Total | | 7,980,768 | | 3,586,154 | | 29,440,966 |
| By fishermen: | | | | | | |
| Cod, green salted ... pounds | 3,225,216 | 145,134 | | | 1,870,485 | 74,800 |
| Cod, tongues ... do | | | | | 2,600 | 130 |
| Shrimp: | | | | | | |
| Dried ... do | | | | | 90,301 | 13,545 |
| Meal or bran ... do | | | | | 194,000 | 1,940 |
| Total | 2,225,216 | 145,134 | | | 2,157,386 | 90,415 |
| Grand total | | 8,125,902 | | 3,586,154 | | 29,531,381 |

[1] This item is usually an intermediate product and although included in the total, may be shown in its final stage of processing in this or another State.
[2] The production of this item has been included under "Unclassified products."
[3] Includes fresh fillets of "lingcod" and sablefish; frozen fillets of flounders; fresh halibut cheeks; packaged cooked and peeled shrimp; and fresh-shucked bay scallops.
[4] Includes fresh fillets of flounders, "lingcod", and rockfishes; and fresh-shucked hard clams.
[5] Includes packaged cooked and peeled shrimp; and fresh-shucked Eastern, Japanese, and native oysters.
[6] This item has been included under "Miscellaneous."
[7] Includes salted barracuda, herring, mackerel, pilchards, sablefish, yellowtail, and black and white sea bass; boneless salt cod; and green salt cod in process, partly boned.
[8] Includes smoked shad and smelt, and kippered salmon and sturgeon.
[9] Includes smoked bonito, chubs, herring, mackerel, and yellowtail; and kippered sablefish.
[10] Includes canned herring for bait; shad roe; sturgeon caviar; hard clam chowder, cocktail, and nectar; and razor clam juice.
[11] Includes canned fish chowder, gefilte fish, shad roe, squid, and tuna cocktail.
[12] Includes shrimp meal or bran and miscellaneous fish meal.
[13] Includes tuna, whale, sperm, and miscellaneous oil.
[14] Includes kippered herring and herring bloaters; spiced herring; salted salmon bellies; salmon-egg meal; crushed oyster shell for poultry feed; and miscellaneous liver oil.
[15] Includes salted sablefish; canned crabs and Japanese oysters; salmon and salmon-egg meal; crushed oyster shell for poultry feed; and marine-shell novelties.
[16] Includes oyster-shell lime; marine-shell novelties; liquid glue; and kelp products.

NOTE.—The total value of manufactured products in the Pacific Coast States was as follows: By manufacturing establishments, $41,007,888; and by fishermen, $235,549. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. All of the persons engaged in the preparation of fishermen's manufactured products have also been included as fishermen.

## WASHINGTON

### *Fisheries of Washington, 1934*

CATCH: BY DISTRICTS

| Species | Puget Sound district | | Coastal district | | Columbia River district | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Carp | | | | | 99,600 | $2,988 |
| Cod [1] | 10,403,900 | $145,134 | | | | |
| Flounders: | | | | | | |
| "Sole" | 954,600 | 32,261 | | | 7,100 | 232 |
| Other | 56,500 | 1,220 | | | | |
| Halibut | 23,181,200 | 1,669,796 | 3,800 | $232 | 91,000 | 7,733 |
| Herring | 242,000 | 1,531 | | | | |
| "Lingcod" | 1,067,700 | 34,563 | 28,700 | 772 | 9,200 | 268 |
| Perch | 62,000 | 1,681 | | | | |
| Rockfishes | 540,100 | 19,488 | 20,100 | 402 | 6,200 | 151 |
| Sablefish | 2,235,400 | 85,050 | | | 7,400 | 236 |
| Salmon: | | | | | | |
| Blueback, red or sockeye | 23,530,600 | 1,491,629 | 349,800 | 31,093 | 209,200 | 20,920 |
| Chinook or king | 7,591,600 | 568,654 | 1,574,100 | 88,425 | 7,836,900 | 533,660 |
| Chum or keta | 7,732,400 | 181,559 | 1,359,300 | 20,390 | 631,900 | 8,152 |
| Humpback or pink | 190,500 | 5,715 | | | | |
| Silver or coho | 8,243,100 | 358,864 | 2,211,500 | 96,407 | 1,103,000 | 49,379 |
| Shad | | | | | 171,100 | 5,133 |
| Smelt | 283,600 | 13,471 | 89,700 | 3,588 | 2,199,100 | 22,102 |
| Steelhead trout | | | 54,700 | 2,406 | 1,316,600 | 74,782 |
| Sturgeon | | | | | 31,000 | 878 |
| Total | 86,315,200 | 4,610,616 | 5,691,700 | 243,715 | 13,719,300 | 726,614 |
| SHELLFISH | | | | | | |
| Crabs | 281,200 | 15,888 | 843,700 | 47,936 | | |
| Shrimp | 59,900 | 4,193 | | | | |
| Squid | 5,600 | 196 | | | | |
| Clams: | | | | | | |
| Hard: | | | | | | |
| Butter | 309,200 | 15,053 | | | | |
| Little neck | 373,800 | 21,229 | | | | |
| Razor | | | | | | |
| Octopus | 65,700 | 2,193 | 547,800 | 78,260 | | |
| Oysters: | | | | | | |
| Eastern, market | | | 500 | 175 | | |
| Japanese, market | 1,425,300 | 88,081 | 3,499,800 | 267,978 | | |
| Native market | 308,900 | 176,077 | 8,800 | 3,872 | | |
| Scallops, bay | 12,200 | 3,051 | | | | |
| Total | 2,841,800 | 325,961 | 4,900,600 | 398,221 | | |
| Grand total | 89,157,000 | 4,936,577 | 10,592,300 | 641,936 | 13,719,300 | 726,614 |

[1] The cod were taken off Alaska.

### *Fisheries of the Puget Sound district of Washington, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines | Haul seines | Gill nets | | Lines | | Pound nets | Brush weirs |
|---|---|---|---|---|---|---|---|---|
| | | | Drift | Set | Trawl, set, and hand | Troll | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | |
| On vessels | 1,776 | 18 | | | 1,172 | 195 | 19 | |
| On boats and shore | 21 | 202 | 308 | 3 | 88 | 336 | 238 | 10 |
| Total | 1,797 | 220 | 308 | 3 | 1,260 | 531 | 257 | 10 |
| Vessels: | | | | | | | | |
| Motor | 223 | 5 | | | 150 | 111 | 7 | |
| Net tonnage | 5,179 | 44 | | | 4,276 | 953 | 120 | |
| Sail | | | | | 3 | | | |
| Net tonnage | | | | | 1,346 | | | |
| Total vessels | 223 | 5 | | | 153 | 111 | 7 | |
| Total net tonnage | 5,179 | 44 | | | 5,622 | 953 | 120 | |
| Boats: | | | | | | | | |
| Motor | 4 | 45 | 296 | 3 | 83 | 247 | 25 | |
| Other | | 20 | 2 | | 35 | | 112 | 5 |
| Accessory boats | 227 | | | | 79 | | | |
| Apparatus: | | | | | | | | |
| Number | 227 | 65 | 298 | 3 | 25,557 | 1,790 | 112 | 5 |
| Length, yards | 135,746 | 5,821 | | | | | | |
| Square yards | | | 390,976 | 810 | | | | |
| Hooks | | | | | 522,714 | 8,055 | | |

*Fisheries of the Puget Sound district of Washington, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Dip nets | Drag bag nets | Reef nets | Beam trawls | Otter trawls | Traps, crab | Tongs and rakes | Shovels | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen; | | | | | | | | | |
| On vessels | | | | 18 | 40 | | | | 3,118 |
| On boats and shore | 9 | 100 | 24 | 4 | 18 | 92 | 242 | 392 | 1,915 |
| Total | 9 | 100 | 24 | 22 | 58 | 92 | 242 | 392 | 5,033 |
| Vessels: | | | | | | | | | |
| Steam | | | | 1 | | | | | 1 |
| Net tonnage | | | | 23 | | | | | 23 |
| Motor | | | | 5 | 16 | | | | 492 |
| Net tonnage | | | | 48 | 249 | | | | 10,651 |
| Sail | | | | | | | | | 3 |
| Net tonnage | | | | | | | | | 1,346 |
| Total vessels | | | | 6 | 16 | | | | 496 |
| Total net tonnage | | | | 71 | 249 | | | | 12,020 |
| Boats: | | | | | | | | | |
| Motor | 6 | 32 | 6 | 2 | 9 | 88 | 40 | | 854 |
| Other | 3 | 11 | 12 | | | 4 | 128 | | 328 |
| Accessory boats | | | | | | | | | 306 |
| Apparatus: | | | | | | | | | |
| Number | 9 | 37 | 6 | 8 | 25 | 2,576 | 160 | 392 | |
| Length, yards | | 2,959 | | | | | | | |
| Yards at mouth | | | | 42 | 304 | | | | |

CATCH: By gear

| Species | Purse seines | | Haul seines | | Gill nets | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Drift | | Set | |
| FISH | | | | | | | | |
| Flounders: | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| "Sole" | | | 1,600 | $54 | | | 100 | $3 |
| Other | | | 5,700 | 123 | | | | |
| Herring | | | 2,100 | 21 | | | | |
| "Lingcod" | | | | | | | 3,400 | 102 |
| Perch | | | 43,800 | 1,205 | | | | |
| Rockfishes | | | 4,300 | 119 | | | 100 | 3 |
| Salmon:[3] | | | | | | | | |
| Blueback, red or sockeye | 14,086,500 | $892,810 | 9,600 | 672 | 33,800 | $2,143 | 2,600 | 165 |
| Chinook or king | 461,800 | 20,991 | 5,200 | 423 | 434,700 | 27,343 | | |
| Chum or keta | 6,783,600 | 158,764 | | | 362,900 | 9,072 | | |
| Humpback or pink | 150,700 | 4,522 | | | 300 | 9 | | |
| Silver or coho | 4,500,600 | 157,523 | 200 | 10 | 327,500 | 15,851 | | |
| Smelt | | | 170,000 | 8,075 | | | | |
| Total | 25,983,200 | 1,234,610 | 242,500 | 10,702 | 1,159,200 | 54,418 | 6,200 | 273 |
| SHELLFISH | | | | | | | | |
| Squid | | | 5,300 | 185 | | | | |
| Grand total | 25,983,200 | 1,234,610 | 247,800 | 10,887 | 1,159,200 | 54,418 | 6,200 | 273 |

| Species | Lines | | | | Pound nets | | Brush weirs | |
|---|---|---|---|---|---|---|---|---|
| | Trawl, set, and hand [1] | | Troll | | | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Cod [2] | 10,403,900 | $145,134 | | | | | | |
| Flounders, "sole" | 700 | 20 | | | | | | |
| Halibut | 23,144,000 | 1,667,085 | 35,100 | $2,580 | | | | |
| Herring | | | | | | | 236,400 | $1,466 |
| "Lingcod" | 796,400 | 27,097 | 34,500 | 759 | | | | |
| Perch | 900 | 31 | | | | | | |
| Rockfishes | 426,400 | 16,389 | 3,800 | 76 | | | | |
| Sablefish | 2,235,200 | 85,043 | | | | | | |

[1] In addition, the vessels in the Pacific coast halibut fleet landed about 540,000 pounds of halibut, sablefish, and "lingcod" livers at Seattle, which were valued at $111,000.
[2] The cod were taken off Alaska.

*Fisheries of the Puget Sound district of Washington, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Lines | | | | Pound nets | | Brush weirs | |
|---|---|---|---|---|---|---|---|---|
| | Trawl, set, and hand | | Troll | | | | | |
| Salmon:[3] | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Vulue* | *Pounds* | *Value* |
| Blueback, red or sockeye | | | | | 9, 388, 300 | $595, 218 | | |
| Chinook or king | | | 2, 963, 700 | $251, 618 | 3, 725, 300 | 268, 222 | | |
| Chum or keta | | | | | 577, 700 | 13, 518 | | |
| Humpback or pink | | | 200 | 6 | 39, 300 | 1, 178 | | |
| Silver or coho | | | 2, 196, 100 | 126, 495 | 1, 213, 800 | 58, 748 | | |
| Total | 37, 007, 500 | $1, 940, 799 | 5, 233, 400 | 381, 534 | 14, 944, 400 | 936, 884 | 236, 400 | $1, 466 |
| SHELLFISH | | | | | | | | |
| Octopus | 64, 900 | 2, 165 | | | | | | |
| Grand total | 37, 072, 400 | 1, 942, 964 | 5, 233, 400 | 381. 534 | 14, 944, 400 | 936, 884 | 236, 400 | 1, 466 |

| Species | Dip nets | | Drag bag nets | | Reef nets | | Beam trawls | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Herring | 3, 400 | $43 | 100 | $1 | | | | |
| Perch | | | 12, 800 | 329 | | | | |
| Rockfishes | | | 400 | 11 | | | | |
| Salmon:[3] | | | | | | | | |
| Blueback, red or sockeye | | | | | 9, 800 | $621 | | |
| Chinook or king | | | | | 900 | 57 | | |
| Chum or keta | | | | | 8, 200 | 205 | | |
| Silver or coho | | | | | 4, 900 | 237 | | |
| Smelt | | | 113, 600 | 5, 396 | | | | |
| Total | 3, 400 | 43 | 126, 900 | 5, 737 | 23, 800 | 1, 120 | | |
| SHELLFISH | | | | | | | | |
| Shrimp | | | | | | | 59, 900 | $4, 193 |
| Squid | | | 300 | 11 | | | | |
| Scallops, bay [7] | | | | | | | 12, 200 | 3, 051 |
| Total | | | 300 | 11 | | | 72, 100 | 7, 244 |
| Grand total | 3, 400 | 43 | 127, 200 | 5, 748 | 23, 800 | 1, 120 | 72, 100 | 7, 244 |

| Species | Otter trawls | | Traps, crab | | Tongs and rakes | | Shovels | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders: | | | | | | | | |
| "Sole" | 952, 200 | $32, 184 | | | | | | |
| Other | 50, 800 | 1, 097 | | | | | | |
| Halibut | 2, 100 | 131 | | | | | | |
| "Lingcod" | 233, 400 | 6, 605 | | | | | | |
| Perch | 4, 500 | 116 | | | | | | |
| Rockfishes | 105, 100 | 2, 890 | | | | | | |
| Sablefish | 200 | 7 | | | | | | |
| Total | 1, 348. 300 | 43, 030 | | | | | | |
| SHELLFISH | | | | | | | | |
| Crabs [4] | | | 281, 200 | $15, 888 | | | | |
| Clams, hard:[5] | | | | | | | | |
| Butter | | | | | | | 309, 200 | $15, 053 |
| Little neck | | | | | | | 373, 800 | 21, 229 |
| Octopus | 800 | 28 | | | | | | |
| Oysters:[6] | | | | | | | | |
| Japanese, market | | | | | 1, 425, 300 | $88, 081 | | |
| Native, market | | | | | 308, 900 | 176, 077 | | |
| Total | 800 | 28 | 281, 200 | 15, 888 | 1, 734, 200 | 264, 158 | 683, 000 | 36. 282 |
| Grand total | 1, 349, 100 | 43, 058 | 281, 200 | 15, 888 | 1, 734, 200 | 264, 158 | 683, 000 | 36, 282 |

[3] Statistics of the catch of salmon except those taken by troll lines are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback, red or sockeye 7.1 pounds; chinook or king 22 pounds; chum or keta 10 pounds, for all gear, except purse seines, for which a factor of 9.4 pounds was used; humpback or pink 5 pounds; and silver or coho 8 pounds.

[4] The weight of crabs shown is based on an average of 20 pounds per dozen.

[5] Statistics on hard clams as used in this table are based on yields of 28 percent edible meats for butter clams and 24 percent for little neck clams.

[6] Statistics on oysters are based on yields of 16 percent edible meats for native oysters and 14 percent for Japanese oysters.

[7] The weight of bay scallops is based on a yield of 15 percent edible meat.

*Fisheries of the coastal district of Washington, 1934*

OPERATING UNITS: By gear

| Item | Gill nets | | Lines, troll | Pound nets | Dip nets | Drag bag nets | Traps, crab | Tongs and rakes | Dredges | Shovels | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Drift | Set | | | | | | | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | | | |
| On vessels | | | 21 | | | | 18 | | 8 | | 47 |
| On boats and shore | 140 | 173 | 136 | 60 | 41 | 36 | 76 | 220 | | 2,394 | 3,044 |
| Total | 140 | 173 | 157 | 60 | 41 | 36 | 94 | 220 | 8 | 2,394 | 3,091 |
| Vessels: | | | | | | | | | | | |
| Motor | | | 12 | | | | 9 | | 2 | | 21 |
| Net tonnage | | | 93 | | | | 68 | | 13 | | 156 |
| Boats: | | | | | | | | | | | |
| Motor | 126 | 92 | 96 | 43 | | | 49 | 46 | | | 448 |
| Other | | 39 | | 32 | | 6 | | 105 | | | 180 |
| Apparatus: | | | | | | | | | | | |
| Number | 126 | 193 | 540 | 99 | 41 | 6 | 2,605 | 145 | 4 | 2,394 | |
| Length, yards | | | | | | 390 | | | | | |
| Square yards | 225,400 | 53,259 | | | | | | | | | |
| Yards at mouth | | | | | | | | | 6 | | |
| Hooks | | | 2,430 | | | | | | | | |

CATCH: By gear

| Species | Gill nets | | | | Lines, troll | |
|---|---|---|---|---|---|---|
| | Drift | | Set | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Halibut | | | | | 3,800 | $232 |
| "Lingcod" | | | | | 28,700 | 772 |
| Rockfishes | | | | | 20,100 | 402 |
| Salmon:[1] | | | | | | |
| Blueback, red or sockeye | | | 336,500 | $29,914 | | |
| Chinook or king | 394,000 | $13,790 | 223,400 | 7,819 | 723,000 | 58,636 |
| Chum or keta | 192,200 | 2,883 | 333,400 | 5,001 | | |
| Silver or coho | 385,300 | 13,486 | 405,900 | 14,206 | 883,800 | 49,937 |
| Steelhead trout | | | 54,700 | 2,406 | | |
| Total | 971,500 | 30,159 | 1,353,900 | 59,346 | 1,659,400 | 109,979 |

| Species | Pound nets | | Dip nets | | Drag bag nets | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Salmon:[1] | | | | | | |
| Blueback, red or sockeye | | | 13,300 | $1,179 | | |
| Chinook or king | 233,700 | $8,180 | | | | |
| Chum or keta | 833,700 | 12,506 | | | | |
| Silver or coho | 536,500 | 18,778 | | | | |
| Smelt | | | 29,700 | 1,188 | 60,000 | $2,400 |
| Total | 1,603,900 | 39,464 | 43,000 | 2,367 | 60,000 | 2,400 |

| Species | Traps, crab | | Dredges, tongs, and rakes | | Shovels | |
|---|---|---|---|---|---|---|
| SHELLFISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs[2] | 843,700 | $47,936 | | | | |
| Clams, razor[3] | | | | | 547,800 | $78,260 |
| Oysters:[4] | | | | | | |
| Eastern, market | | | 500 | $175 | | |
| Japanese, market | | | 3,499,800 | 267,978 | | |
| Native, market | | | 8,800 | 3,872 | | |
| Total | 843,700 | 47,936 | 3,509,100 | 272,025 | 547,800 | 78,260 |

[1] Statistics of the catch of salmon except those taken by troll lines are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback, red or sockeye, 4.5 pounds; chinook or king, 22 pounds; chum or keta, 10 pounds; silver or coho, 10 pounds; and steelhead trout, 10 pounds.

[2] The weight of crabs as shown in this table is based on an average of 22 pounds per dozen.

[3] The weight of razor clams shown is based on a yield of 42 percent edible meats.

[4] The statistics on oysters used in this table are based on yields of 14 percent edible meats for Japanese and native oysters, and 13 percent for eastern oysters.

*Fisheries of the Columbia River district of Washington, 1934*

OPERATING UNITS: By gear

| Item | Haul seines | Gill nets | | Lines | | Pound nets | Fish wheels | Dip nets | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | Drift | Set | Trawl and set | Troll | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | 8 | | | | | 8 |
| On boats and shore | 264 | 548 | 45 | 9 | 22 | 188 | 20 | 178 | 1,152 |
| Total | 264 | 548 | 45 | 17 | 22 | 188 | 20 | 178 | 1,160 |
| Vessels: | | | | | | | | | |
| Motor | | | | 2 | | | | | 2 |
| Net tonnage | | | | 34 | | | | | 34 |
| Boats: | | | | | | | | | |
| Motor | 16 | 394 | 38 | 9 | 15 | 94 | | 88 | 602 |
| Other | 24 | | 7 | | | 43 | | 6 | 78 |
| Apparatus: | | | | | | | | | |
| Number | 24 | 394 | 96 | 309 | 60 | 211 | 27 | 178 | |
| Length, yards | 7,560 | | | | | | | | |
| Square yards | | 1,095,320 | 24,384 | | | | | | |
| Hooks | | | | 7,200 | 240 | | | | |

CATCH: By gear

| Species | Haul seines | | Gill nets | | | | Lines, trawl and set | |
|---|---|---|---|---|---|---|---|---|
| | | | Drift | | Set | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Carp | 99,600 | $2,988 | | | | | | |
| Flounders, "sole" | | | | | | | 7,100 | $232 |
| Halibut | | | | | | | 91,000 | 7,733 |
| "Lingcod" | | | | | | | 9,200 | 268 |
| Rockfishes | | | | | | | 6,200 | 151 |
| Sablefish | | | | | | | 7,400 | 236 |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | 31,600 | 3,160 | 26,400 | $2,640 | 1,400 | $140 | | |
| Chinook or king | 1,843,400 | 126,642 | 3,005,700 | 206,492 | 53,100 | 2,920 | | |
| Chum or keta | 1,000 | 13 | 406,200 | 5,240 | 21,900 | 283 | | |
| Silver or coho | 20,300 | 792 | 448,900 | 19,931 | 8,100 | 300 | | |
| Shad | 55,600 | 1,668 | 43,100 | 1,293 | 100 | 3 | | |
| Smelt | | | 205,000 | 6,150 | | | | |
| Steelhead trout | 214,300 | 11,786 | 268,400 | 15,433 | 2,600 | 147 | | |
| Sturgeon | 1,000 | 17 | 11,500 | 315 | 2,300 | 72 | 2,100 | 63 |
| Total | 2,266,800 | 147,066 | 4,415,200 | 257,494 | 89,500 | 3,865 | 123,000 | 8,683 |

| Species | Lines, troll | | Pound nets | | Fish wheels | | Dip nets | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | | | 49,400 | $4,940 | 81,600 | $8,160 | 18,800 | $1,880 |
| Chinook or king | 30,200 | $2,658 | 2,515,600 | 172,822 | 195,200 | 13,410 | 193,700 | 8,716 |
| Chum or keta | | | 202,200 | 2,608 | | | 600 | 8 |
| Silver or coho | 103,200 | 5,366 | 522,500 | 22,990 | | | | |
| Shad | | | 68,100 | 2,043 | 4,200 | 126 | | |
| Smelt | | | | | | | 1,994,100 | 15,952 |
| Steelhead trout | 200 | 12 | 767,200 | 44,114 | 30,900 | 1,591 | 33,000 | 1,699 |
| Sturgeon | | | 5,500 | 153 | 8,600 | 258 | | |
| Total | 133,600 | 8,036 | 4,130,500 | 249,670 | 320,500 | 23,545 | 2,240,200 | 28,255 |

## OREGON

### *Fisheries of Oregon, 1934*

CATCH: BY DISTRICTS

| Species | Columbia River district | | Coastal district | |
|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* |
| Carp | 6,000 | $180 | | |
| Flounders: | | | | |
| "Sole" | 19,100 | 835 | 3,700 | $84 |
| Other | 300 | 18 | 48,000 | 714 |
| Halibut | 382,000 | 29,729 | 118,900 | 8,469 |
| Herring | | | 37,400 | 416 |
| "Lingcod" | 62,600 | 2,326 | 67,100 | 1,332 |
| Perch | | | 8,700 | 146 |
| Rockfishes | 34,800 | 1,025 | 18,100 | 469 |
| Sablefish | 78,600 | 2,408 | 23,800 | 583 |
| Salmon: | | | | |
| Blueback, red or sockeye | 207,000 | 20,700 | | |
| Chinook or king | 10,820,400 | 747,453 | 1,289,600 | 77,963 |
| Chum or keta | 542,200 | 7,015 | 429,900 | 4,513 |
| Silver or coho | 2,427,300 | 120,738 | 4,491,100 | 188,360 |
| Shad | 488,500 | 14,655 | 416,700 | 9,377 |
| Smelt | 564,000 | 14,100 | 200 | 12 |
| Steelhead trout | 1,168,200 | 65,858 | 290,700 | 21,101 |
| Striped bass | | | 23,700 | 1,405 |
| Sturgeon | 48,100 | 1,318 | 800 | 26 |
| Tuna, albacore | 500 | 62 | 500 | 50 |
| Total | 16,849,600 | 1,028,420 | 7,268,900 | 315,020 |
| SHELLFISH | | | | |
| Crabs | | | 2,086,400 | 85,352 |
| Crawfish | 143,600 | 14,360 | | |
| Clams: | | | | |
| Razor | | | 38,600 | 5,521 |
| Mixed | | | 38,500 | 1,907 |
| Oysters: | | | | |
| Japanese, market | | | 24,500 | 1,741 |
| Native, market | | | 7,800 | 4,357 |
| Total | 143,600 | 14,360 | 2,195,800 | 98,878 |
| Grand total | 16,993,200 | 1,042,780 | 9,464,700 | 413,898 |

### *Fisheries of the Columbia River district of Oregon, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Gill nets | | Lines | | Pound nets | Dip nets | Traps, crawfish | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | Drift | Set | Trawl and set | Troll | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | 11 | 28 | | | | 39 |
| On boats and shore | 455 | 1,180 | 68 | 40 | 175 | 30 | 133 | 32 | 2,068 |
| Total | 455 | 1,180 | 68 | 51 | 203 | 30 | 133 | 32 | 2,107 |
| Vessels: | | | | | | | | | |
| Motor | | | | 3 | 16 | | | | 19 |
| Net tonnage | | | | 48 | 128 | | | | 176 |
| Boats: | | | | | | | | | |
| Motor | 18 | 871 | 56 | 37 | 144 | 15 | 5 | 25 | 1,145 |
| Other | 33 | | 12 | 3 | | 7 | | 7 | 59 |
| Apparatus: | | | | | | | | | |
| Number | 33 | 871 | 137 | 434 | 796 | 27 | 133 | 1,920 | |
| Length, yards | 17,255 | | | | | | | | |
| Square yards | | 2,754,973 | 38,497 | | | | | | |
| Hooks | | | | 12,125 | 3,582 | | | | |

*Fisheries of the Columbia River district of Oregon, 1934*—Continued

CATCH: BY GEAR

| Species | Haul seines | | Gill nets | | | | Lines | |
|---|---|---|---|---|---|---|---|---|
| | | | Drift | | Set | | Trawl and set | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Carp | 6,000 | $180 | | | | | | |
| Flounders: | | | | | | | | |
| "Sole" | | | | | | | 19,100 | $835 |
| Other | | | | | | | 300 | 18 |
| Halibut | | | | | | | 382,000 | 29,729 |
| "Lingcod" | | | | | | | 62,600 | 2,326 |
| Rockfishes | | | | | | | 34,800 | 1,025 |
| Sablefish | | | | | | | 78,600 | 2,408 |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | 57,900 | 5,790 | 133,700 | $13,370 | 4,400 | $440 | | |
| Chinook, or king | 1,850,400 | 127,122 | 7,787,300 | 534,987 | 37,700 | 2,074 | | |
| Chum or keta | 22,100 | 285 | 488,600 | 6,303 | 10,100 | 130 | | |
| Silver or coho | 67,800 | 2,644 | 400,400 | 17,778 | 4,700 | 174 | | |
| Shad | 261,400 | 7,842 | 226,600 | 6,798 | | | | |
| Smelt | | | 564,000 | 14,100 | | | | |
| Steelhead trout | 429,500 | 23,622 | 459,900 | 26,344 | 14,900 | 843 | | |
| Sturgeon | 700 | 19 | 22,800 | 625 | 4,500 | 123 | 18,400 | 504 |
| Tuna, albacore | | | | | | | 500 | 62 |
| Total | 2,695,800 | 167,504 | 10,083,300 | 620,305 | 76,300 | 3,784 | 596,300 | 36,907 |

| Species | Lines—Continued | | Pound nets | | Dip nets | | Traps, crawfish | |
|---|---|---|---|---|---|---|---|---|
| | Troll | | | | | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | | | 7,000 | $700 | 4,000 | $400 | | |
| Chinook, or king | 504,400 | $44,387 | 424,300 | 29,149 | 216,300 | 9,734 | | |
| Chum or keta | | | 21,400 | 297 | | | | |
| Silver or coho | 1,768,500 | 91,962 | 185,900 | 8,180 | | | | |
| Shad | | | 500 | 15 | | | | |
| Steelhead trout | 600 | 35 | 199,200 | 11,713 | 64,100 | 3,301 | | |
| Sturgeon | 100 | 3 | 400 | 11 | 1,200 | 33 | | |
| Total | 2,273,600 | 136,387 | 838,700 | 50,065 | 285,600 | 13,468 | | |
| SHELLFISH | | | | | | | | |
| Crawfish, fresh water | | | | | | | 143,600 | $14,360 |
| Grand total | 2,273,600 | 136,387 | 838,700 | 50,065 | 285,600 | 13,468 | 143,600 | 14,360 |

*Fisheries of the coastal district of Oregon, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Gill nets | | Lines | | Otter trawls | Traps, crab | Tongs and rakes | Shovels | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Drift | Set | Trawl and set | Troll | | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | 5 | 11 | 3 | | | | 16 |
| On boats and shore | 10 | 515 | 330 | 32 | 162 | | 292 | 13 | 136 | 1,438 |
| Total | 10 | 515 | 330 | 37 | 173 | 3 | 292 | 13 | 136 | 1,454 |
| Vessels: | | | | | | | | | | |
| Motor | | | | 1 | 7 | 1 | | | | 8 |
| Net tonnage | | | | 16 | 71 | 16 | | | | 87 |
| Boats: | | | | | | | | | | |
| Motor | 3 | 473 | 204 | 26 | 121 | | 275 | 4 | | 954 |
| Other | 3 | | 120 | 6 | | | 17 | 9 | | 131 |
| Apparatus: | | | | | | | | | | |
| Number | 3 | 515 | 795 | 183 | 845 | 1 | 8,760 | 13 | 136 | |
| Length, yards | 466 | | | | | | | | | |
| Square yards | | 630,875 | 254,400 | | | | | | | |
| Yards at mouth | | | | | | 20 | | | | |
| Hooks | | | | 6,425 | 3,802 | | | | | |

*Fisheries of the coastal district of Oregon, 1934*—Continued

CATCH: BY GEAR

| Species | Haul seines | | Gill nets | | Lines | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Trawl and set | | Troll | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders. | | | | | 2, 500 | $63 | 500 | $10 |
| "Sole" | 20, 100 | $302 | 3, 600 | $36 | 13, 700 | 213 | | |
| Other | | | | | 109, 100 | 7, 798 | 9, 200 | 632 |
| Halibut | 12, 400 | 166 | 25, 000 | 250 | | | | |
| Herring | | | | | 29, 400 | 600 | 35, 300 | 642 |
| "Lingcod" | 6, 000 | 95 | 2, 700 | 51 | | | | |
| Perch | | | | | 14, 900 | 391 | 3, 100 | 75 |
| Rockfishes | | | | | 23, 800 | 583 | | |
| Sablefish | | | | | | | | |
| Salmon: | | | | | | | | |
| Chinook or king | | | 1, 076, 400 | 59, 203 | | | 213, 200 | 18, 760 |
| Chum or keta | | | 429, 900 | 4, 513 | | | | |
| Silver or coho | | | 2, 657, 300 | 93, 004 | | | 1, 833, 800 | 95, 356 |
| Shad | | | 416, 700 | 9, 377 | | | | |
| Smelt | | | 200 | 12 | | | | |
| Steelhead trout | | | 290, 700 | 21, 101 | | | | |
| Striped bass | | | 23, 700 | 1, 405 | | | | |
| Sturgeon | | | 800 | 26 | | | | |
| Tuna, albacore | | | | | | | 500 | 50 |
| Total | 38, 500 | 563 | 1, 927, 000 | 188, 978 | 193, 400 | 9, 648 | 2, 095, 600 | 115, 525 |

| Species | Otter trawls | | Traps, crab | | Tongs and rakes | | Shovels | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders: | | | | | | | | |
| "Sole" | 700 | $11 | | | | | | |
| Other | 10, 600 | 163 | | | | | | |
| Halibut | 600 | 39 | | | | | | |
| "Lingcod" | 2, 400 | 90 | | | | | | |
| Rockfishes | 100 | 3 | | | | | | |
| Total | 14, 400 | 306 | | | | | | |
| SHELLFISH | | | | | | | | |
| Crabs | | | 2, 086, 400 | $85, 352 | | | | |
| Clams: | | | | | | | | |
| Razor [1] | | | | | | | 38, 600 | $5, 521 |
| Mixed [2] | | | | | | | 38, 500 | 1, 907 |
| Oysters: | | | | | | | | |
| Japanese, market | | | | | 24, 500 | $1, 741 | | |
| Native, market | | | | | 7, 800 | 4, 357 | | |
| Total | | | 2, 086, 400 | 85, 352 | 32, 300 | 6, 098 | 77, 100 | 7, 428 |
| Grand total | 14, 400 | 306 | 2, 086, 400 | 85, 352 | 32, 300 | 6, 098 | 77, 100 | 7, 428 |

[1] Statistics on razor clams used in this table show the quantity of edible meats based on 42 percent of the round weight.

[2] Mixed clams consist principally of eastern soft-shelled clams. The quantity shown is that of the edible meats and equals 21 percent of the round weight.

## CALIFORNIA

*Fisheries of California, 1934*

CATCH: BY DISTRICTS

| Species | Northern district | | San Francisco district [1] | | Monterey district | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| FISH | | | | | | |
| Anchovies | | | 67,000 | $1,004 | 127,400 | $1,930 |
| Carp | | | 158,000 | 2,140 | | |
| Catfish | | | 184,900 | 22,647 | | |
| Cod [1] | | | 6,036,400 | 76,100 | | |
| Flounders: | | | | | | |
| "California halibut" | | | 28,100 | 2,352 | 35,900 | 2,665 |
| "Sole" | 3,219,900 | $160,995 | 4,293,100 | 243,449 | 934,800 | 31,138 |
| Other | 488,600 | 16,981 | 716,800 | 31,737 | 156,300 | 5,845 |
| Flyingfish | | | | | | |
| Grayfish | 4,100 | 41 | 96,600 | 966 | 6,100 | 61 |
| Groupers | | | | | | |
| Hake | 800 | 8 | 48,200 | 482 | 7,700 | 77 |
| Halibut | 1,023,000 | 64,192 | | | | |
| Hardhead | | | 147,400 | 6,882 | | |
| Herring | 3,500 | 26 | 755,700 | 4,087 | 11,200 | 112 |
| Horse mackerel | | | | | 138,500 | 3,011 |
| Kingfish | | | 14,000 | 421 | 244,200 | 7,699 |
| "Lingcod" | 430,800 | 11,090 | 323,900 | 12,048 | 100,300 | 4,615 |
| Mackerel | | | 3,700 | 111 | 5,123,900 | 41,298 |
| Perch | 5,600 | 152 | 113,500 | 7,945 | 29,500 | 1,136 |
| Pilchard or sardine | | | 367,800,800 | 1,359,138 | 478,923,400 | 1,774,968 |
| Pompano | | | | | 100 | 53 |
| Rockfishes | 400,300 | 10,152 | 544,200 | 24,644 | 1,775,200 | 55,921 |
| Sablefish | 794,600 | 23,664 | 158,400 | 3,961 | 506,100 | 9,369 |
| Salmon | 2,769,300 | 211,539 | 1,264,100 | 89,203 | 286,200 | 28,829 |
| Sculpin | | | 800 | 8 | 4,400 | 45 |
| Sea bass, white | | | 300 | 28 | 2,400 | 260 |
| Shad | | | 872,600 | 28,288 | | |
| Skates | 5,500 | 68 | 168,300 | 2,103 | 39,600 | 485 |
| Smelt | 28,900 | 965 | 266,600 | 13,050 | 162,700 | 6,893 |
| Splittail | | | 55,000 | 662 | | |
| Squawfish | | | 1,600 | 53 | | |
| Striped bass | | | 801,300 | 47,794 | | |
| Suckers | | | 63,000 | 701 | | |
| Tomcod | 300 | 6 | 600 | 12 | | |
| Tuna, albacore | | | | | 800 | 60 |
| Whitebait | 76,000 | 3,424 | 10,700 | 534 | 19,300 | 1,229 |
| Other fish | 111,000 | 2,463 | 90,200 | 2,254 | 23,000 | 1,221 |
| Total | 9,362,200 | 505,766 | 385,085,800 | 1,984,804 | 488,659,000 | 1,978,920 |
| SHELLFISH | | | | | | |
| Crabs | 110,800 | 7,053 | 3,421,800 | 293,593 | 235,500 | 11,798 |
| Shrimp | | | 1,783,700 | 27,222 | 900 | 184 |
| Abalone | | | | | 557,400 | 95,914 |
| Clams: | | | | | | |
| Hard | 9,900 | 903 | 14,600 | 3,595 | | |
| Pismo | | | | | 4,800 | 1,088 |
| Soft | 100 | 11 | 71,000 | 15,628 | | |
| Octopus | 700 | 35 | 10,600 | 471 | 19,000 | 1,443 |
| Oysters, market: | | | | | | |
| Eastern | | | 89,100 | 38,981 | | |
| Japanese | | | | | 6,700 | 1,675 |
| Native | | | 5,000 | 2,728 | | |
| Squid | | | | | 1,486,400 | 30,673 |
| Total | 121,500 | 8,002 | 5,395,800 | 382,218 | 2,310,700 | 142,775 |
| WHALE PRODUCTS | | | | | | |
| Whale meat | | | 2,044,000 | 40,880 | | |
| Whale oil | | | 1,954,400 | 50,700 | | |
| Total | | | 3,998,400 | 91,580 | | |
| Grand total | 9,483,700 | 513,768 | 394,480,000 | 2,458,602 | 490,969,700 | 2,121,695 |

[1] The catch of cod was taken off Alaska.

NOTE.—The catch of pilchard includes 232,322,700 pounds, valued at $858,274, which were delivered to floating reduction plants. The catch in previous years delivered to these plants was not included.

*Fisheries of California, 1934*—Continued

CATCH: BY DISTRICTS—Continued

| Species | San Pedro district | | | | | |
|---|---|---|---|---|---|---|
| | Off California | | Off Latin America | | Total | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| FISH | | | | | | |
| Anchovies | 63,100 | $788 | | | 63,100 | $788 |
| Barracuda | 1,575,800 | 57,275 | 143,000 | $12,142 | 1,718,800 | 69,417 |
| Cabrilla | | | 168,200 | 7,077 | 168,200 | 7,077 |
| Corbina | | | 1,000 | 62 | 1,000 | 62 |
| Flounders: | | | | | | |
| "California halibut" | 531,500 | 44,382 | 102,200 | 7,750 | 633,700 | 52,132 |
| "Sole" | 517,400 | 15,052 | | | 517,400 | 15,052 |
| Other | 15,000 | 2,128 | | | 15,000 | 2,128 |
| Flyingfish | 26,400 | 885 | | | 26,400 | 885 |
| Grayfish | 384,800 | 11,080 | 1,100 | 32 | 385,900 | 11,112 |
| Groupers | | | 39,900 | 2,075 | 39,900 | 2,075 |
| Hake | 200 | 5 | | | 200 | 5 |
| Herring | 400 | 20 | | | 400 | 20 |
| Horse mackerel | 1,441,200 | 11,986 | | | 1,441,200 | 11,986 |
| Kingfish | 371,500 | 6,542 | | | 371,500 | 6,542 |
| "Lingcod" | 1,500 | 43 | 100 | 3 | 1,600 | 46 |
| Mackerel | 97,151,900 | 616,543 | | | 97,151,900 | 616,543 |
| Marlin | 19,900 | 984 | 100 | 4 | 20,000 | 988 |
| Mullet | 3,700 | 175 | 1,000 | 29 | 4,700 | 204 |
| Perch | 43,300 | 2,656 | | | 43,300 | 2,656 |
| Pilchard or sardine | 285,180,800 | 1,030,282 | | | 285,180,800 | 1,030,282 |
| Pompano | 4,400 | 1,853 | | | 4,400 | 1,853 |
| Rock bass | 216,100 | 12,388 | 25,100 | 1,421 | 241,200 | 13,809 |
| Rockfishes | 1,406,500 | 52,731 | 14,100 | 535 | 1,420,600 | 53,266 |
| Rudderfishes | 32,300 | 1,389 | | | 32,300 | 1,389 |
| Sablefish | 643,700 | 19,817 | | | 643,700 | 19,817 |
| Sculpin | 58,600 | 4,020 | | | 58,600 | 4,020 |
| Sea bass: | | | | | | |
| Black | 17,600 | 794 | 475,200 | 22,164 | 492,800 | 22,958 |
| White | 400,700 | 24,801 | 122,800 | 9,100 | 523,500 | 33,901 |
| Sheepshead | 137,500 | 4,601 | 200 | 7 | 137,700 | 4,608 |
| Skates | 14,500 | 268 | | | 14,500 | 268 |
| Smelt | 242,100 | 8,451 | 100 | 4 | 242,200 | 8,455 |
| Spanish mackerel | | | 3,200 | 152 | 3,200 | 152 |
| Swordfish | 193,100 | 28,050 | | | 193,100 | 28,050 |
| Tuna and tunalike fishes: | | | | | | |
| Albacore | 119,000 | 9,143 | | | 119,000 | 9,143 |
| Bluefin | 17,940,200 | 826,288 | 16,500 | 1,262 | 17,956,700 | 827,550 |
| Bonito | 2,001,000 | 49,768 | 34,300 | 931 | 2,035,300 | 50,699 |
| Skipjack or striped tuna | | | 3,808,900 | 152,481 | 3,808,900 | 152,481 |
| Yellowfin | 200 | 14 | 19,451,800 | 974,688 | 19,452,000 | 974,702 |
| Whitefish | 31,800 | 2,197 | 18,100 | 910 | 49,900 | 3,107 |
| Yellowtail | 126,500 | 5,582 | 1,022,100 | 40,798 | 1,148,600 | 46,380 |
| Other fish | 8,800 | 282 | 1,100 | 53 | 9,900 | 335 |
| Total | 410,923,000 | 2,853,263 | 25,450,100 | 1,233,680 | 436,373,100 | 4,086,943 |
| SHELLFISH | | | | | | |
| Crabs | 24,600 | 793 | | | 24,600 | 793 |
| Sea crawfish or spiny lobster | 295,900 | 47,238 | 111,100 | 21,001 | 407,000 | 68,239 |
| Abalone | 87,300 | 8,828 | | | 87,300 | 8,828 |
| Clams: | | | | | | |
| Hard | 4,100 | 954 | | | 4,100 | 954 |
| Pismo | 30,400 | 6,285 | | | 30,400 | 6,285 |
| Octopus | 100 | 15 | | | 100 | 15 |
| Squid | 39,700 | 921 | | | 39,700 | 921 |
| Turtles | | | 300 | 23 | 300 | 23 |
| Total | 482,100 | 65,034 | 111,400 | 21,024 | 593,500 | 86,058 |
| Grand total | 411,405,100 | 2,918,297 | 25,561,500 | 1,254,704 | 436,966,600 | 4,173,001 |

*Fisheries of California, 1934*—Continued

CATCH: BY DISTRICTS—Continued

| Species | San Diego district | | | | | |
|---|---|---|---|---|---|---|
| | Off California | | Off Latin America | | Total | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | 225,400 | $9,637 | 238,600 | $15,805 | 464,000 | $25,442 |
| Cabrilla | | | 163,500 | 6,451 | 163,500 | 6,451 |
| Flounders: | | | | | | |
| "California halibut" | 53,000 | 3,460 | 286,300 | 20,500 | 339,300 | 23,960 |
| "Sole" | 2,400 | 206 | | | 2,400 | 206 |
| Grayfish | 29,000 | 207 | 4,600 | 48 | 33,600 | 255 |
| Groupers | | | 21,500 | 1,001 | 21,500 | 1,001 |
| Herring | 28,100 | 273 | 2,700 | 21 | 30,800 | 294 |
| Horse mackerel | 1,600 | 16 | | | 1,600 | 16 |
| Kingfish | 4,600 | 110 | | | 4,600 | 110 |
| Mackerel | 11,302,800 | 60,640 | 266,200 | 1,536 | 11,569,000 | 62,176 |
| Marlin | 41,400 | 1,669 | 3,400 | 142 | 44,800 | 1,811 |
| Mullet | 14,300 | 591 | | | 14,300 | 591 |
| Perch | 500 | 17 | 300 | 6 | 800 | 23 |
| Pilchard or sardine | 4,651,300 | 13,301 | 2,500 | 39 | 4,053,800 | 13,340 |
| Rock bass | 115,400 | 4,944 | 55,800 | 1,944 | 171,200 | 6,888 |
| Rockfishes | 285,600 | 10,901 | 182,700 | 8,068 | 468,300 | 18,969 |
| Sablefish | 1,300 | 22 | 1,100 | 23 | 2,400 | 45 |
| Sculpin | 7,400 | 359 | | | 7,400 | 359 |
| Sea bass: | | | | | | |
| Black | 36,100 | 931 | 329,900 | 13,894 | 366,000 | 14,825 |
| White | 65,300 | 4,094 | 260,100 | 18,176 | 325,400 | 22,270 |
| Sheepshead | 4,300 | 152 | 1,500 | 41 | 5,800 | 193 |
| Skates | 4,400 | 45 | | | 4,400 | 45 |
| Smelt | 28,300 | 980 | 1,300 | 71 | 29,600 | 1,051 |
| Spanish mackerel | | | 3,700 | 73 | 3,700 | 73 |
| Swordfish | 64,800 | 8,262 | 6,100 | 832 | 70,900 | 9,094 |
| Tuna and tunalike fishes: | | | | | | |
| Bluefin | 351,500 | 16,214 | 49,600 | 2,318 | 401,100 | 18,532 |
| Bonito | 1,002,000 | 22,464 | 165,400 | 3,713 | 1,167,400 | 26,177 |
| Skipjack or striped tuna | | | 11,021,300 | 441,043 | 11,021,300 | 441,043 |
| Yellowfin | 19,300 | 970 | 41,441,900 | 2,077,557 | 41,461,200 | 2,078,52 |
| Whitefish | 15,900 | 734 | 27,400 | 1,364 | 43,300 | 2,098 |
| Yellowtail | 84,100 | 2,192 | 1,114,500 | 30,816 | 1,198,600 | 33,008 |
| Total | 17,840,100 | 163,391 | 55,651,900 | 2,645,482 | 73,492,000 | 2,808,873 |
| SHELLFISH | | | | | | |
| Sea crawfish or spiny lobster | 70,700 | 11,111 | 705,000 | 100,914 | 775,700 | 112,025 |
| Squid | 4,400 | 128 | | | 4,400 | 128 |
| Turtles | | | 3,400 | 162 | 3,400 | 162 |
| Total | 75,100 | 11,239 | 708,400 | 101,076 | 783,500 | 112,315 |
| Grand total | 17,915,200 | 174,630 | 56,360,300 | 2,746,558 | 74,275,500 | 2,921,188 |

CATCH: BY WATERS

| Species | Off California [1] | | Off Latin America | |
|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* |
| Anchovies | 257,500 | $3,722 | | |
| Barracuda | 1,801,200 | 66,912 | 381,600 | $27,947 |
| Cabrilla | | | 331,700 | 13,528 |
| Carp | 158,000 | 2,140 | | |
| Catfish | 184,900 | 22,647 | | |
| Cod [1] | 6,036,400 | 76,100 | | |
| Corbina | | | 1,000 | 62 |
| Flounders: | | | | |
| "California halibut" | 648,500 | 52,859 | 388,500 | 28,250 |
| "Sole" | 8,967,600 | 450,840 | | |
| Other | 1,376,700 | 56,691 | | |
| Flyingfish | 26,400 | 885 | | |
| Grayfish | 520,600 | 12,355 | 5,700 | 80 |
| Groupers | | | 61,400 | 3,076 |
| Hake | 56,900 | 572 | | |
| Halibut | 1,023,000 | 64,192 | | |
| Hardhead | 147,400 | 6,882 | | |
| Herring | 798,900 | 4,518 | 2,700 | 21 |
| Horse mackerel | 1,581,300 | 15,013 | | |
| Kingfish | 634,300 | 14,772 | | |

[1] The catch of cod was taken off Alaska.

*Fisheries of California, 1934*—Continued

CATCH: By waters—Continued

| Species | Off California | | Off Latin America | |
|---|---|---|---|---|
| FISH—continued | *Pounds* | *Value* | *Pounds* | *Value* |
| "Lingcod" | 856, 500 | $27, 796 | 100 | $3 |
| Mackerel | 113, 582, 300 | 718, 592 | 266, 200 | 1, 536 |
| Marlin | 61, 300 | 2, 653 | 3, 500 | 146 |
| Mullet | 18, 000 | 766 | 1, 000 | 29 |
| Perch | 192, 400 | 11, 906 | 300 | 6 |
| Pilchard or sardine | 1, 135, 956, 300 | 4, 178, 049 | 2, 500 | 39 |
| Pompano | 4, 500 | 1, 906 | | |
| Rock bass | 331, 500 | 17, 332 | 80, 900 | 3, 365 |
| Rockfishes | 4, 411, 800 | 154, 349 | 196, 800 | 8, 603 |
| Rudderfishes | 32, 300 | 1, 389 | | |
| Sablefish | 2, 104, 100 | 56, 833 | 1, 100 | 23 |
| Salmon | 4, 319, 600 | 329, 571 | | |
| Sculpin | 71, 200 | 4, 432 | | |
| Sea bass: | | | | |
| Black | 53, 700 | 1, 725 | 805, 100 | 36, 058 |
| White | 468, 700 | 29, 183 | 382, 900 | 27, 276 |
| Shad | 872, 000 | 28, 288 | | |
| Sheepshead | 141, 800 | 4, 753 | 1, 700 | 48 |
| Skates | 232, 300 | 2, 969 | | |
| Smelt | 728, 600 | 30, 339 | 1, 400 | 75 |
| Spanish mackerel | | | 6, 900 | 225 |
| Splittail | 55, 000 | 662 | | |
| Squawfish | 1, 600 | 53 | | |
| Striped bass | 801, 300 | 47, 794 | | |
| Suckers | 63, 000 | 701 | | |
| Swordfish | 257, 900 | 36, 312 | 6, 100 | 832 |
| Tomcod | 900 | 18 | | |
| Tuna and tunalike fishes: | | | | |
| Albacore | 119, 800 | 9, 203 | | |
| Bluefin | 18, 291, 700 | 842, 502 | 66, 100 | 3, 580 |
| Bonito | 3, 003, 000 | 72, 232 | 199, 700 | 4, 644 |
| Skipjack or striped tuna | | | 14, 830, 200 | 593, 524 |
| Yellowfin | 19, 500 | 984 | 60, 893, 700 | 3, 052, 245 |
| Whitebait | 106, 000 | 5, 187 | | |
| Whitefish | 47, 700 | 2, 931 | 45, 500 | 2, 274 |
| Yellowtail | 210, 600 | 7, 774 | 2, 136, 600 | 71, 614 |
| Other fish | 233, 000 | 6, 220 | 1, 100 | 53 |
| Total | 1, 311, 870, 100 | 7, 486, 144 | 81, 102, 000 | 3, 879, 162 |
| SHELLFISH | | | | |
| Crabs | 3, 792, 700 | 313, 237 | | |
| Sea crawfish or spiny lobster | 366, 600 | 58, 349 | 816, 100 | 121, 915 |
| Shrimp | 1, 784, 600 | 27, 406 | | |
| Abalone | 644, 700 | 104, 742 | | |
| Clams: | | | | |
| Hard | 28, 600 | 5, 452 | | |
| Pismo | 35, 200 | 7, 373 | | |
| Soft | 71, 100 | 15, 639 | | |
| Octopus | 30, 400 | 1, 964 | | |
| Oysters, market: | | | | |
| Eastern | 89, 100 | 38, 981 | | |
| Japanese | 6, 700 | 1, 675 | | |
| Native | 5, 000 | 2, 728 | | |
| Squid | 1, 530, 500 | 31, 722 | | |
| Turtles | | | 3, 700 | 185 |
| Total | 8, 385, 200 | 609, 268 | 819, 800 | 122, 100 |
| WHALE PRODUCTS | | | | |
| Whale meat | 2, 044, 000 | 40, 880 | | |
| Whale oil | 1, 954, 400 | 50, 700 | | |
| Total | 3, 998, 400 | 91, 580 | | |
| Grand total | 1, 324, 253, 700 | 8, 186, 992 | 81, 921, 800 | 4, 001, 262 |

*Fisheries of the northern district of California, 1934*

OPERATING UNITS: By gear

| Item | Gill nets | Lines | | Dip nets | Traps, crab | Shovels | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|
| | | Set and hand | Troll | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 1 | 26 | 32 | | 1 | | 34 |
| On boats and shore | 23 | 95 | 218 | 30 | 34 | 14 | 271 |
| Total | 24 | 121 | 250 | 30 | 35 | 14 | 305 |
| Vessels, motor | 1 | 9 | 14 | | 1 | | 14 |
| Net tonnage | 7 | 73 | 121 | | 7 | | 121 |
| Boats: | | | | | | | |
| Motor | 14 | 70 | 194 | | 32 | | 202 |
| Other | 1 | 1 | | | | | 1 |
| Apparatus: | | | | | | | |
| Number | 16 | 497 | 1,006 | 30 | 579 | 14 | |
| Square yards | 12,000 | | | | | | |
| Hooks | | 88,086 | 4,604 | | | | |

CATCH: By gear

| Species | Gill nets | | Lines | | | | Dip nets | |
|---|---|---|---|---|---|---|---|---|
| | | | Set and hand | | Troll | | | |
| FISH | | | | | | | | |
| Flounders: | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Other | 7,600 | $294 | 1,300 | $53 | | | | |
| Halibut | | | 793,400 | 49,863 | 14,800 | $857 | | |
| Herring | 3,500 | 26 | | | | | | |
| "Lingcod" | | | 138,900 | 3,892 | 24,500 | 423 | | |
| Perch | 5,200 | 142 | | | | | 400 | $10 |
| Rockfishes | | | 125,900 | 3,222 | 2,200 | 291 | | |
| Sablefish | | | 696,300 | 20,776 | | | | |
| Salmon | | | | | 2,769,300 | 211,539 | | |
| Smelt | 15,800 | 602 | | | | | 13,100 | 363 |
| Whitebait | 400 | 17 | | | | | 75,600 | 3,407 |
| Other fish | | | 4,500 | 334 | 400 | 7 | | |
| Total | 31,900 | 1,081 | 1,760,300 | 78,140 | 2,811,200 | 213,117 | 89,100 | 3,780 |
| SHELLFISH | | | | | | | | |
| Octopus | | | 700 | 35 | | | | |
| Grand total | 31,900 | 1,081 | 1,761,000 | 78,175 | 2,811,200 | 213,117 | 89,100 | 3,780 |

| Species | Paranzella nets | | Traps | | Shovels | |
|---|---|---|---|---|---|---|
| FISH | | | | | | |
| Flounders: | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| "Sole" | 3,219,900 | $160,995 | | | | |
| Other | 480,300 | 16,634 | | | | |
| Grayfish | 4,100 | 41 | | | | |
| Hake | 800 | 8 | | | | |
| Halibut | 214,800 | 13,472 | | | | |
| "Lingcod" | 267,400 | 6,775 | | | | |
| Rockfishes | 272,200 | 6,639 | | | | |
| Sablefish | 98,300 | 2,888 | | | | |
| Skates | 5,500 | 68 | | | | |
| Tomcod | 300 | 6 | | | | |
| Other fish | 106,100 | 2,122 | | | | |
| Total | 4,669,700 | 209,648 | | | | |
| SHELLFISH | | | | | | |
| Crabs | 100 | 9 | 110,700 | $7,044 | | |
| Clams: | | | | | | |
| Hard | | | | | 9,900 | $903 |
| Soft | | | | | 100 | 11 |
| Total | 100 | 9 | 110,700 | 7,044 | 10,000 | 914 |
| Grand total | 4,669,800 | 209,657 | 110,700 | 7,044 | 10,000 | 914 |

Note.—The catch by paranzella nets was made entirely by fishermen from the San Francisco district.

*Fisheries of the San Francisco district of California, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines, sardine | Lampara and ring nets, sardine | Haul seines | Gill nets | | | Lines | | Fyke nets |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Drift, salmon | Drift, shad | Other | Set and hand | Troll | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 346 | 104 | -------- | -------- | -------- | -------- | 6 | 79 | -------- |
| On boats and shore | -------- | 84 | 13 | 279 | 339 | 66 | 165 | 212 | 80 |
| Total | 346 | 188 | 13 | 279 | 339 | 66 | 171 | 291 | 80 |
| Vessels: | | | | | | | | | |
| Motor | 33 | 10 | -------- | -------- | -------- | -------- | 1 | 15 | -------- |
| Net tonnage | 1,446 | 130 | -------- | -------- | -------- | -------- | 9 | 244 | -------- |
| Sail | -------- | -------- | -------- | -------- | -------- | -------- | 2 | -------- | -------- |
| Net tonnage | -------- | -------- | -------- | -------- | -------- | -------- | 824 | -------- | -------- |
| Total vessels | 33 | 10 | -------- | -------- | -------- | -------- | 3 | 15 | -------- |
| Total net tonnage | 1,446 | 130 | -------- | -------- | -------- | -------- | 833 | 244 | -------- |
| Boats: | | | | | | | | | |
| Motor | -------- | 10 | 5 | 154 | 186 | 36 | 33 | 208 | 52 |
| Other | -------- | -------- | 1 | 1 | 5 | 2 | 20 | -------- | 7 |
| Accessory boats | 33 | 10 | 5 | -------- | -------- | -------- | 30 | -------- | -------- |
| Apparatus: | | | | | | | | | |
| Number | 33 | 20 | 6 | 155 | 191 | 55 | 1,150 | 870 | 2,075 |
| Length, yards | 11,187 | 5,550 | 770 | -------- | -------- | -------- | -------- | -------- | -------- |
| Square yards | -------- | -------- | -------- | 534,750 | 673,275 | 64,543 | -------- | -------- | -------- |
| Hooks | -------- | -------- | -------- | -------- | -------- | -------- | 63,032 | 5,315 | -------- |

| Item | Dip nets | Bag nets, shrimp | Paranzella nets | Beam trawls | Traps, crab | Harpoons, whaling | Rakes and tongs | Shovels | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | -------- | 17 | 88 | -------- | -------- | 16 | -------- | -------- | 603 |
| On boats and shore | 3 | 29 | -------- | 19 | 275 | -------- | 20 | 82 | 937 |
| Total | 3 | 46 | 88 | 19 | 275 | 16 | 20 | 82 | 1,540 |
| Vessels: | | | | | | | | | |
| Steam | -------- | -------- | -------- | -------- | -------- | 2 | -------- | -------- | 2 |
| Net tonnage | -------- | -------- | -------- | -------- | -------- | 41 | -------- | -------- | 41 |
| Motor | -------- | 4 | 18 | -------- | -------- | -------- | -------- | -------- | 61 |
| Net tonnage | -------- | 25 | 255 | -------- | -------- | -------- | -------- | -------- | 1,761 |
| Sail | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | 2 |
| Net tonnage | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | 824 |
| Total vessels | -------- | 4 | 18 | -------- | -------- | 2 | -------- | -------- | 65 |
| Total net tonnage | -------- | 25 | 255 | -------- | -------- | 41 | -------- | -------- | 2,626 |
| Boats: | | | | | | | | | |
| Motor | 2 | 4 | -------- | 19 | 268 | -------- | 9 | -------- | 555 |
| Other | 1 | 3 | -------- | -------- | -------- | -------- | 9 | 6 | 38 |
| Accessory boats | -------- | -------- | -------- | -------- | -------- | -------- | -------- | -------- | 78 |
| Apparatus: | | | | | | | | | |
| Number | 3 | 11 | 9 | 19 | 5,226 | 2 | 20 | 82 | -------- |
| Length, yards | -------- | 7,312 | -------- | -------- | -------- | -------- | -------- | -------- | -------- |
| Yards at mouth | -------- | -------- | 150 | 127 | -------- | -------- | -------- | -------- | -------- |

*Fisheries of the San Francisco district of California, 1934*—Continued

CATCH: BY GEAR

| Species | Purse seines | | Lampara and ring nets | | Haul seines | | Gill nets | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Anchovies | | | 21,200 | $317 | 45,800 | $687 | | |
| Carp | | | | | 117,600 | 1,764 | 28,700 | $262 |
| Flounders, other | | | | | | | 600 | 25 |
| Hardhead | | | | | 134,900 | 6,141 | | |
| Herring | | | | | 395,500 | 2,139 | 360,200 | 1,948 |
| Kingfish | | | 900 | 27 | | | | |
| "Lingcod" | | | | | 300 | 10 | | |
| Mackerel | | | 3,700 | 111 | | | | |
| Perch | | | 500 | 35 | 21,000 | 1,470 | 92,000 | 6,440 |
| Pilchard or sardine | 328,164,200 | $1,213,497 | 39,635,000 | 145,625 | 1,400 | 14 | 200 | 2 |
| Salmon | | | | | | | 397,600 | 24,379 |
| Sea bass, white | | | 200 | 19 | | | 100 | 9 |
| Shad | | | | | | | 872,600 | 28,288 |
| Smelt | | | 16,300 | 798 | 3,000 | 147 | 239,700 | 11,733 |
| Splittail | | | | | 51,000 | 510 | | |
| Squawfish | | | | | | | 1,100 | 36 |
| Striped bass | | | | | | | 799,700 | 47,695 |
| Suckers | | | | | | | 2,000 | 91 |
| Tomcod | | | 100 | 2 | | | | |
| Whitebait | | | 2,400 | 120 | 3,500 | 175 | 400 | 20 |
| Other fish | | | | | | | 400 | 8 |
| Total | 328,164,200 | 1,213,497 | 39,680,300 | 147,054 | 774,000 | 13,057 | 2,795,300 | 120,936 |

| Species | Lines | | | | Fyke nets | | Dip nets | |
|---|---|---|---|---|---|---|---|---|
| | Set and hand | | Troll | | | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Carp | | | | | 11,700 | $114 | | |
| Catfish | 26,900 | $2,664 | | | 158,000 | 19,983 | | |
| Cod | 6,036,400 | 76,100 | | | | | | |
| Flounders: | | | | | | | | |
| "California halibut" | 1,100 | 88 | 900 | $72 | | | | |
| "Sole" | 4,200 | 210 | | | | | | |
| Other | 1,400 | 62 | | | | | | |
| Grayfish | 21,300 | 213 | | | | | | |
| Hardhead | | | | | 12,500 | 741 | | |
| Kingfish | 100 | 3 | | | | | | |
| "Lingcod" | 236,600 | 8,816 | 1,200 | 24 | | | | |
| Rockfishes | 311,100 | 14,088 | | | | | | |
| Sablefish | 87,500 | 2,188 | | | | | | |
| Salmon | | | 866,500 | 64,824 | | | | |
| Sculpin | 100 | 1 | | | | | | |
| Skates | 200 | 2 | | | | | | |
| Smelt | | | | | | | 7,600 | $372 |
| Splittail | | | | | 4,000 | 152 | | |
| Squawfish | | | | | 500 | 17 | | |
| Striped bass | 1,600 | 99 | | | | | | |
| Suckers | | | | | 61,000 | 610 | | |
| Whitebait | | | | | | | 4,400 | 219 |
| Other fish | 3,400 | 86 | | | | | | |
| Total | 6,731,900 | 104,620 | 868,600 | 64,920 | 247,700 | 21,617 | 12,000 | 591 |
| SHELLFISH | | | | | | | | |
| Octopus | 10,200 | 454 | | | | | | |
| Grand total | 6,742,100 | 105,074 | 868,600 | 64,920 | 247,700 | 21,617 | 12,000 | 591 |

*Fisheries of the San Francisco district of California, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Bag nets | | Paranzella nets | | Beam trawls | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders: | | | | | | |
| "California halibut" | | | 26,100 | $2,192 | | |
| "Sole" | | | 4,288,900 | 243,239 | | |
| Other | | | 714,800 | 31,650 | | |
| Grayfish | | | 75,300 | 753 | | |
| Hake | | | 48,200 | 482 | | |
| Kingfish | | | 13,000 | 391 | | |
| "Lingcod" | | | 85,800 | 3,198 | | |
| Rockfishes | | | 233,100 | 10,556 | | |
| Sablefish | | | 70,900 | 1,773 | | |
| Sculpin | | | 700 | 7 | | |
| Skates | | | 168,100 | 2,101 | | |
| Tomcod | | | 500 | 10 | | |
| Other fish | | | 86,400 | 2,160 | | |
| Total | | | 5,811,800 | 298,512 | | |
| SHELLFISH | | | | | | |
| Crabs | | | 31,500 | 2,703 | | |
| Shrimp | 1,333,800 | $20,007 | | | 449,900 | $7,215 |
| Octopus | | | 400 | 17 | | |
| Total | 1,333,800 | 20,007 | 31,900 | 2,720 | 449,900 | 7,215 |
| Grand total | 1,333,800 | 20,007 | 5,843,700 | 301,232 | 449,900 | 7,215 |

| Species | Traps | | Harpoons | | Rakes and tongs | | Shovels | |
|---|---|---|---|---|---|---|---|---|
| SHELLFISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs | 3,390,300 | $290,890 | | | | | | |
| Clams: | | | | | | | | |
| Hard | | | | | | | 14,600 | $3,595 |
| Soft | | | | | | | 71,000 | 15,628 |
| Oysters, market: | | | | | | | | |
| Eastern | | | | | 89,100 | $38,981 | | |
| Native | | | | | 5,000 | 2,728 | | |
| Total | 3,390,300 | 290,890 | | | 94,100 | 41,709 | 85,600 | 19,223 |
| WHALE PRODUCTS | | | | | | | | |
| Whale meat | | | 2,044,000 | $40,880 | | | | |
| Whale oil | | | 1,954,400 | 50,700 | | | | |
| Total | | | 3,998,400 | 91,580 | | | | |
| Grand total | 3,390,300 | 290,890 | 3,998,400 | 91,580 | 94,100 | 41,709 | 85,600 | 19,223 |

*Fisheries of the Monterey district of California, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines, sardine | Lampara and ring nets | | Gill nets | | | Lines | |
|---|---|---|---|---|---|---|---|---|
| | | Sardine | Other | Set, "California halibut" | Set, crab | Other | Set and hand | Troll |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | |
| On vessels | 433 | 188 | 40 | | | | | |
| On boats and shore | | 174 | 110 | 13 | 36 | 41 | 199 | 182 |
| Total | 433 | 362 | 150 | 13 | 36 | 41 | 199 | 182 |
| Vessels, motor | 42 | 17 | 5 | | | | | |
| Net tonnage | 1,669 | 204 | 52 | | | | | |
| Boats: | | | | | | | | |
| Motor | | 15 | 18 | 8 | 25 | 21 | 149 | 173 |
| Other | | | | | | 10 | 33 | |
| Accessory boats | 42 | 32 | 23 | | | | | |
| Apparatus: | | | | | | | | |
| Number | 42 | 32 | 23 | 8 | 25 | 34 | 853 | 467 |
| Length, yards | 13,850 | 8,840 | 4,025 | | | | | |
| Square yards | | | | 37,826 | 49,225 | 36,840 | | |
| Hooks | | | | | | | 87,646 | 2,672 |

*Fisheries of the Monterey district of California, 1934*—Continued

OPERATING UNITS: By gear—Continued

| Item | Paranzella nets | Traps | | Rakes and tongs | Shovels | Abalone outfits | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|
| | | Crab | Octopus | | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | |
| On vessels | 8 | | | | | 68 | 648 |
| On boats and shore | 4 | 14 | 2 | 6 | 31 | 16 | 556 |
| Total | 12 | 14 | 2 | 6 | 31 | 84 | 1,204 |
| Vessels, motor | 2 | | | | | 14 | 67 |
| Net tonnage | 28 | | | | | 103 | 1,878 |
| Boats: | | | | | | | |
| Motor | 2 | 8 | 1 | 1 | 7 | 3 | 217 |
| Other | | 4 | | 3 | 12 | | 38 |
| Accessory boats | | | | | | | 89 |
| Apparatus: | | | | | | | |
| Number | 2 | 112 | 6 | 6 | 31 | 17 | |
| Yards at mouth | 33 | | | | | | |

CATCH: By gear

| Species | Purse seines | | Lampara and ring nets | | Gill nets | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| FISH | | | | | | |
| Anchovies | | | 126,800 | $1,921 | 600 | $9 |
| Flounders: | | | | | | |
| "California halibut" | | | 1,200 | 93 | 28,100 | 2,086 |
| "Sole" | | | 100 | 3 | 4,000 | 145 |
| Other | | | | | 9,100 | 260 |
| Herring | 4,000 | $40 | 2,300 | 23 | 4,900 | 49 |
| Horse mackerel | 27,400 | 596 | 107,900 | 2,346 | 2,500 | 55 |
| Kingfish | | | 81,700 | 2,575 | 78,600 | 2,477 |
| "Lingcod" | | | 100 | 4 | 2,300 | 106 |
| Mackerel | 99,300 | 799 | 4,607,700 | 37,142 | 500 | 5 |
| Perch | | | 3,200 | 138 | 23,700 | 896 |
| Pilchard or sardine | 342,803,300 | 1,270,428 | 136,117,000 | 504,509 | 3,100 | 31 |
| Pompano | | | 100 | 53 | | |
| Rockfishes | | | 100 | 2 | 700 | 26 |
| Sculpin | | | | | 700 | 8 |
| Sea bass, white | | | 1,300 | 135 | 1,100 | 125 |
| Skates | | | | | 4,200 | 51 |
| Smelt | 1,200 | 51 | 32,900 | 1,399 | 114,800 | 4,859 |
| Tuna, albacore | 800 | 60 | | | | |
| Whitebait | | | 17,000 | 1,081 | 2,300 | 148 |
| Other fish | | | | | 300 | 21 |
| Total | 342,936,000 | 1,271,974 | 141,099,400 | 551,424 | 281,500 | 11,357 |
| SHELLFISH | | | | | | |
| Crabs | | | | | 201,400 | 10,091 |
| Squid | 1,100 | 23 | 1,484,400 | 30,631 | 900 | 19 |
| Total | 1,100 | 23 | 1,484,400 | 30,631 | 202,300 | 10,110 |
| Grand total | 342,937,100 | 1,271,997 | 142,583,800 | 582,055 | 483,800 | 21,467 |

*Fisheries of the Monterey district of California, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Lines | | | | Paranzella nets | |
|---|---|---|---|---|---|---|
| | Set and hand | | Troll | | | |
| FISH | | | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders: | | | | | | |
| "California halibut" | 3,400 | $252 | 400 | $27 | 2,800 | $207 |
| "Sole" | 16,300 | 591 | | | 914,400 | 30,399 |
| Other | 13,300 | 534 | | | 133,900 | 5,051 |
| Grayfish | 400 | 4 | | | 5,700 | 57 |
| Hake | | | | | 7,700 | 77 |
| Horse mackerel | 700 | 14 | | | | |
| Kingfish | 73,500 | 2,318 | | | 10,400 | 329 |
| "Lingcod" | 84,300 | 3,880 | 1,500 | 70 | 12,100 | 555 |
| Mackerel | 416,400 | 3,352 | | | | |
| Perch | 1,700 | 65 | | | 900 | 37 |
| Rockfishes | 1,676,500 | 51,895 | 200 | 8 | 97,700 | 3,990 |
| Sablefish | 441,700 | 8,177 | | | 64,400 | 1,192 |
| Salmon | | | 286,200 | 28,829 | | |
| Sculpin | 3,700 | 37 | | | | |
| Skates | 6,300 | 77 | | | 29,100 | 357 |
| Smelt | 13,800 | 584 | | | | |
| Other fish | 800 | 41 | | | 21,900 | 1,159 |
| Total | 2,752,800 | 71,821 | 288,300 | 28,934 | 1,301,000 | 43,410 |
| SHELLFISH | | | | | | |
| Crabs | | | | | 500 | 24 |
| Octopus | 4,200 | 316 | | | | |
| Total | 4,200 | 316 | | | 500 | 24 |
| Grand total | 2,757,000 | 72,137 | 288,300 | 28,934 | 1,301,500 | 43,434 |

| Species | Traps | | Rakes and tongs | | Shovels | | Abalone outfits | |
|---|---|---|---|---|---|---|---|---|
| SHELLFISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crabs | 33,600 | $1,683 | | | | | | |
| Shrimp | 900 | 184 | | | | | | |
| Abalone | | | | | | | 557,400 | $95,914 |
| Clams, Pismo | | | | | 4,800 | $1,088 | | |
| Octopus | 14,800 | 1,127 | | | | | | |
| Oysters, market, Japanese | | | 6,700 | $1,675 | | | | |
| Total | 49,300 | 2,994 | 6,700 | 1,675 | 4,800 | 1,088 | 557,400 | 95,914 |

*Fisheries of the San Pedro district of California, 1934*

OPERATING UNITS: BY GEAR

| Item | Purse seines | | | Lampara and ring nets | | | Gill nets | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mackerel | Sardine | Tuna | Mackerel | Sardine | Other [1] | Drift, barracuda | Set, sea bass | Other |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | |
| On vessels | 168 | 743 | 696 | 522 | 430 | 34 | 12 | 8 | 2 |
| On boats and shore | | | | 74 | 17 | 22 | 38 | 58 | 35 |
| Total | 168 | 743 | 696 | 596 | 447 | 56 | 50 | 66 | 37 |
| Vessels, motor | 17 | 71 | 66 | 53 | 41 | 3 | 4 | 3 | 1 |
| Net tonnage | 466 | 2,920 | 2,884 | 869 | 914 | 61 | 41 | 22 | 8 |
| Boats: | | | | | | | | | |
| Motor | | | | 9 | 2 | 6 | 14 | 26 | 15 |
| Other | | | | | | | | 3 | 5 |
| Accessory boats | 17 | 71 | 66 | 62 | 43 | 9 | | | |
| Apparatus: | | | | | | | | | |
| Number | 17 | 71 | 66 | 62 | 43 | 9 | 18 | 32 | 23 |
| Length, yards | 6,707 | 27,187 | 38,212 | 24,686 | 18,282 | 3,240 | | | |
| Square yards | | | | | | | 201,546 | 155,936 | 14,522 |

[1] Includes 1 haul seine.

*Fisheries of the San Pedro district of California, 1934*—Continued

OPERATING UNITS: BY GEAR—Continued

| Item | Trammel nets | Lines | | Paranzella nets | Traps, lobster | Harpoons, swordfish | Shovels | Abalone outfits | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | Set and hand | Troll | | | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 15 | 373 | 18 | 10 | 16 | 27 | | 5 | 1,725 |
| On boats and shore | 72 | 410 | 206 | 14 | 178 | 62 | 64 | 1 | 723 |
| Total | 87 | 783 | 224 | 24 | 194 | 89 | 64 | 6 | 2,448 |
| Vessels, motor | 5 | 51 | 7 | 3 | 8 | 9 | | 1 | 186 |
| Net tonnage | 47 | 2,902 | 47 | 41 | 62 | 96 | | 9 | 7,155 |
| Boats: | | | | | | | | | |
| Motor | 30 | 251 | 143 | 5 | 112 | 28 | 1 | | 349 |
| Other | 1 | 33 | | | 23 | | 3 | 1 | 50 |
| Accessory boats | | 32 | | | | | | | 205 |
| Apparatus: | | | | | | | | | |
| Number | 36 | 1,592 | 724 | 4 | 5,172 | 37 | 64 | 2 | |
| Square yards | 188,784 | | | | | | | | |
| Yards at mouth | | | | 67 | | | | | |
| Hooks | | 289,456 | 724 | | | | | | |

CATCH OFF CALIFORNIA: BY GEAR

| Species | Purse seines | | Lampara and ring nets | | Gill nets | | Trammel nets | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Anchovies | | | 63,100 | $788 | | | | |
| Barracuda | 371,500 | $13,018 | 1,001,600 | 36,341 | 106,100 | $4,404 | | |
| Flounders: | | | | | | | | |
| "California halibut" | 100 | 10 | 400 | 49 | 100 | 10 | 324,100 | $29,072 |
| "Sole" | | | 200 | 10 | | | 5,900 | 248 |
| Other | | | 100 | 4 | | | 100 | 4 |
| Flyingfish | | | 1,300 | 43 | 25,100 | 842 | | |
| Grayfish | 100 | 4 | 3,000 | 88 | 42,000 | 1,109 | 31,500 | 913 |
| Herring | | | | | 400 | 20 | | |
| Horse mackerel | 391,500 | 3,256 | 1,042,900 | 8,673 | 600 | 5 | | |
| Kingfish | | | 240,800 | 4,239 | 100 | 2 | | |
| "Lingcod" | | | | | | | 100 | 4 |
| Mackerel | 10,461,100 | 66,355 | 75,116,900 | 476,480 | 28,800 | 273 | 100 | 1 |
| Marlin | 300 | 13 | | | | | | |
| Mullet | | | 2,200 | 102 | 1,500 | 73 | | |
| Perch | | | 29,700 | 1,987 | 7,300 | 303 | | |
| Pilchard or sardine | 177,098,500 | 639,808 | 108,082,000 | 390,468 | 300 | 6 | | |
| Pompano | | | 4,400 | 1,853 | | | | |
| Rock bass | 7,500 | 437 | 9,900 | 574 | 2,900 | 159 | 3,200 | 162 |
| Rockfishes | | | | | 400 | 16 | 300 | 10 |
| Rudderfishes | 100 | 6 | 30,600 | 1,315 | 1,400 | 57 | | |
| Sablefish | | | | | | | 300 | 8 |
| Sculpin | | | 100 | 8 | | | 100 | 10 |
| Sea bass: | | | | | | | | |
| Black | 800 | 33 | 600 | 24 | 900 | 43 | 900 | 42 |
| White | 62,300 | 3,656 | 204,400 | 11,899 | 127,100 | 8,756 | 300 | 17 |
| Sheepshead | | | | | 1,500 | 52 | 4,100 | 133 |
| Skates | | | | | | | 10,500 | 193 |
| Smelt | 2,700 | 92 | 186,200 | 6,314 | 49,900 | 1,932 | | |
| Tuna and tunalike fishes: | | | | | | | | |
| Albacore | 1,300 | 98 | | | | | | |
| Bluefin | 16,343,100 | 752,727 | 1,594,900 | 73,456 | 100 | 5 | | |
| Bonito | 1,152,400 | 28,662 | 815,400 | 20,279 | 8,600 | 215 | 1,600 | 40 |
| Whitefish | | | 200 | 13 | 400 | 26 | | |
| Yellowtail | 70,700 | 3,120 | 45,100 | 1,993 | 500 | 21 | | |
| Other fish | 100 | 2 | 300 | 21 | 200 | 10 | 200 | 8 |
| Total | 205,964,100 | 1,511,297 | 188,476,300 | 1,037,021 | 406,200 | 18,339 | 383,300 | 30,865 |
| SHELLFISH | | | | | | | | |
| Sea crawfish or spiny lobster | | | | | | | 7,900 | 1,283 |
| Squid | | | 39,400 | 913 | 100 | 3 | 200 | 5 |
| Total | | | 39,400 | 913 | 100 | 3 | 8,100 | 1,288 |
| Grand total | 205,964,100 | 1,511,297 | 188,515,700 | 1,037,934 | 406,300 | 18,342 | 391,400 | 32,153 |

*Fisheries of the San Pedro district of California, 1934*—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

| Species | Lines | | | | Paranzella nets | |
|---|---|---|---|---|---|---|
| | Set and hand | | Troll | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | 62,400 | $2,282 | 34,200 | $1,230 | | |
| Flounders: | | | | | | |
| "California halibut" | 25,400 | 2,318 | | | 181,400 | $12,923 |
| "Sole" | 6,600 | 306 | | | 504,700 | 14,488 |
| Other | 14,800 | 2,120 | | | | |
| Grayfish | 305,100 | 8,910 | 500 | 13 | 2,600 | 43 |
| Hake | 200 | 5 | | | | |
| Horse mackerel | 6,200 | 52 | | | | |
| Kingfish | 130,400 | 2,297 | | | | |
| "Lingcod" | 1,400 | 39 | | | | |
| Mackerel | 11,545,000 | 73,434 | | | | |
| Marlin | 6,200 | 307 | | | | |
| Perch | 5,900 | 335 | | | | |
| Rock bass | 137,300 | 7,876 | | | 100 | 5 |
| Rockfishes | 1,404,800 | 52,674 | | | 800 | 25 |
| Rudderfishes | 200 | 11 | | | | |
| Sableflsh | 643,200 | 19,805 | | | 200 | 4 |
| Sculpin | 57,100 | 3,938 | | | | |
| Sea bass: | | | | | | |
| Black | 14,400 | 652 | | | | |
| White | 6,600 | 473 | | | | |
| Sheepshead | 69,100 | 2,378 | | | | |
| Skates | 3,000 | 56 | | | 1,000 | 19 |
| Smelt | 3,300 | 113 | | | | |
| Tuna and tunalike fishes: | | | | | | |
| Albacore | 5,300 | 412 | 112,400 | 8,633 | | |
| Bluefin | 1,500 | 69 | 600 | 31 | | |
| Bonito | 13,100 | 326 | 9,900 | 246 | | |
| Yellowfin | 100 | 8 | 100 | 6 | | |
| Whitefish | 30,100 | 2,087 | | | | |
| Yellowtail | 6,100 | 270 | 4,100 | 178 | | |
| Other fish | 8,000 | 241 | | | | |
| Total | 14,512,800 | 183,794 | 161,800 | 10,337 | 690,800 | 27,507 |
| SHELLFISH | | | | | | |
| Octopus | 100 | 15 | | | | |
| Grand total | 14,512,900 | 183,809 | 161,800 | 10,337 | 690,800 | 27,507 |

| Species | Traps | | Harpoons | | Shovels | | Abalone outfits | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Kingfish | 200 | $4 | | | | | | |
| Marlin | | | 13,400 | $664 | | | | |
| Perch | 400 | 31 | | | | | | |
| Rock bass | 55,200 | 3,175 | | | | | | |
| Rockfishes | 200 | 6 | | | | | | |
| Sculpin | 1,300 | 64 | | | | | | |
| Sheepshead | 62,800 | 2,038 | | | | | | |
| Swordfish | | | 193,100 | 28,050 | | | | |
| Whitefish | 1,100 | 71 | | | | | | |
| Total | 121,200 | 5,389 | 206,500 | 28,714 | | | | |
| SHELLFISH | | | | | | | | |
| Crabs | 24,600 | 793 | | | | | | |
| Sea crawfish or spiny lobster | 288,000 | 45,955 | | | | | | |
| Abalone | | | | | | | 87,300 | $8,828 |
| Clams: | | | | | | | | |
| Hard | | | | | 4,100 | $954 | | |
| Pismo | | | | | 30,400 | 6,285 | | |
| Total | 312,600 | 46,748 | | | 34,500 | 7,239 | 87,300 | 8,828 |
| Grand total | 433,800 | 52,137 | 206,500 | 28,714 | 34,500 | 7,239 | 87,300 | 8,828 |

*Fisheries of the San Pedro district of California, 1934*—Continued

CATCH OFF LATIN AMERICA: BY GEAR

| Species | Purse seines | | Gill nets | | Trammel nets | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | | | 9,400 | $797 | | |
| Flounders, "California halibut" | | | | | 102,200 | $7,750 |
| Marlin | 100 | $4 | | | | |
| Mullet | | | 1,000 | 29 | | |
| Sea bass: | | | | | | |
| Black | | | 400 | 19 | 900 | 39 |
| White | | | 9,400 | 695 | 100 | 6 |
| Tuna and tunalike fishes: | | | | | | |
| Skipjack or striped tuna | 466,700 | 18,684 | | | | |
| Yellowfin | 1,883,200 | 94,362 | | | | |
| Yellowtail | 9,000 | 359 | 200 | 8 | | |
| Total | 2,359,000 | 113,409 | 20,400 | 1,548 | 103,200 | 7,795 |

| Species | Lines | | | | Harpoons | | Traps | |
|---|---|---|---|---|---|---|---|---|
| | Set and hand | | Troll | | | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | 129,900 | $11,034 | 3,700 | $311 | | | | |
| Cabrilla | 168,200 | 7,077 | | | | | | |
| Corbina | 1,000 | 62 | | | | | | |
| Grayfish | 1,100 | 32 | | | | | | |
| Grouper | 39,900 | 2,075 | | | | | | |
| "Lingcod" | 100 | 3 | | | | | | |
| Rock bass | 25,100 | 1,421 | | | | | | |
| Rockfishes | 14,100 | 535 | | | | | | |
| Sea bass: | | | | | | | | |
| Black | 473,900 | 22,106 | | | | | | |
| White | 113,300 | 8,399 | | | | | | |
| Sheepshead | 200 | 7 | | | | | | |
| Smelt | 100 | 4 | | | | | | |
| Spanish mackerel | 3,200 | 152 | | | | | | |
| Tuna and tunalike fishes: | | | | | | | | |
| Bluefin | 16,500 | 1,262 | | | | | | |
| Bonito | 34,300 | 931 | | | | | | |
| Skipjack or striped tuna | 3,342,200 | 133,797 | | | | | | |
| Yellowfin | 17,568,600 | 880,326 | | | | | | |
| Whitefish | 18,100 | 910 | | | | | | |
| Yellowtail | 1,012,600 | 40,419 | 300 | 12 | | | | |
| Other fish | 1,100 | 53 | | | | | | |
| Total | 22,963,500 | 1,110,605 | 4,000 | 323 | | | | |
| SHELLFISH | | | | | | | | |
| Sea crawfish or spiny lobster | | | | | | | 111,100 | $21,001 |
| Turtles | | | | | 300 | $23 | | |
| Total | | | | | 300 | 23 | 111,100 | 21,001 |
| Grand total | 22,963,500 | 1,110,605 | 4,000 | 323 | 300 | 23 | 111,100 | 21,001 |

*Fisheries of the San Diego district of California, 1934*

OPERATING UNITS: BY GEAR

| Item | Lampara and rin gnets | | Gill nets | | | Tram-mel nets | Lines | | Traps, lob-ster | Har-poons, sword-fish | Total, exclu-sive of dupli-cation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mack-erel | Sar-dine | Drift, barra-cuda | Set, sea bass | Other | | Set and hand | Troll | | | |
| | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* | *Num-ber* |
| Fishermen: | | | | | | | | | | | |
| On vessels | 130 | 69 | 4 | 4 | | 4 | 566 | | 2 | 19 | 676 |
| On boats and shore | 18 | 9 | 36 | 31 | 13 | 31 | 129 | 56 | 53 | 32 | 214 |
| Total | 148 | 78 | 40 | 35 | 13 | 35 | 695 | 56 | 55 | 51 | 890 |
| Vessels, motor | 14 | 7 | 1 | 1 | | 1 | 64 | | 1 | 5 | 76 |
| Net tonnage | 111 | 65 | 5 | 5 | | 5 | 4,206 | | 6 | 51 | 4,296 |
| Boats: | | | | | | | | | | | |
| Motor | 2 | 1 | 15 | 13 | 8 | 11 | 66 | 42 | 35 | 9 | 109 |
| Other | | | | | 1 | | 2 | | 4 | | 5 |
| Accessory boats | 16 | 8 | | | | | 61 | | | | 72 |
| Apparatus: | | | | | | | | | | | |
| Number | 16 | 8 | 16 | 14 | 9 | 12 | 907 | 234 | 1,348 | 14 | |
| Length, yards | 4,813 | 2,320 | | | | | | | | | |
| Square yards | | | 126,800 | 69,230 | 14,360 | 121,120 | | | | | |
| Hooks | | | | | | | 45,620 | 234 | | | |

*Fisheries of the San Diego district of California, 1934*—Continued

CATCH OFF CALIFORNIA: BY GEAR

| Species | Purse seines | | Lampara and ring nets | | Gill nets | | Trammel nets | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | 500 | $19 | 72,600 | $3,105 | 104,700 | $4,476 | | |
| Flounders: "California halibut" | | | 200 | 10 | | | 51,000 | $3,331 |
| Grayfish | | | 7,300 | 52 | 7,100 | 51 | 8,200 | 58 |
| Herring | | | | | 28,100 | 273 | | |
| Horse mackerel | | | 1,600 | 16 | | | | |
| Kingfish | | | 100 | 3 | 700 | 15 | | |
| Mackerel | | | 9,831,700 | 52,747 | 2,400 | 13 | | |
| Mullet | | | | | 14,300 | 591 | | |
| Perch | | | 300 | 10 | 200 | 7 | | |
| Pilchard, or sardine | | | 4,051,300 | 13,301 | | | | |
| Rock bass | | | 8,000 | 333 | 700 | 30 | 100 | 5 |
| Rockfishes | | | 700 | 21 | 200 | 10 | 200 | 9 |
| Sea bass: | | | | | | | | |
| Black | | | 3,700 | 95 | 1,000 | 26 | | |
| White | | | 24,200 | 1,517 | 29,600 | 1,856 | 200 | 14 |
| Skates | | | 300 | 3 | 100 | 2 | 4,000 | 40 |
| Smelt | | | 1,200 | 47 | 27,100 | 933 | | |
| Tuna and tunalike fishes: | | | | | | | | |
| Bluefin | 139,400 | 6,432 | 160,000 | 7,378 | | | | |
| Bonito | 3,300 | 75 | 387,200 | 8,681 | 47,000 | 1,053 | 100 | 3 |
| Yellowtail | | | 30,400 | 791 | 400 | 11 | | |
| Total | 143,200 | 6,526 | 14,580,800 | 88,110 | 263,600 | 9,347 | 63,800 | 3,460 |
| SHELLFISH | | | | | | | | |
| Sea crawfish or spiny lobster | | | | | | | 100 | 11 |
| Squid | | | 4,400 | 128 | | | | |
| Total | | | 4,400 | 128 | | | 100 | 11 |
| Grand total | 143,200 | 6,526 | 14,585,200 | 88,238 | 263,600 | 9,347 | 63,900 | 3,471 |

| Species | Lines | | | | Traps | | Harpoons | |
|---|---|---|---|---|---|---|---|---|
| | Set and hand | | Troll | | | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | 44,000 | $1,884 | 3,600 | $153 | | | | |
| Flounders: | | | | | | | | |
| "California halibut" | 1,800 | 119 | | | | | | |
| "Sole" | 2,400 | 206 | | | | | | |
| Grayfish | 6,400 | 46 | | | | | | |
| Kingfish | 3,100 | 75 | | | 700 | $17 | | |
| Mackerel | 1,464,900 | 7,859 | 3,800 | 21 | | | | |
| Marlin | 1,100 | 46 | | | | | 40,300 | $1,623 |
| Rock bass | 45,600 | 1,972 | | | 61,000 | 2,604 | | |
| Rockfishes | 283,700 | 10,832 | | | 800 | 29 | | |
| Sablefish | 1,300 | 22 | | | | | | |
| Sculpin | 7,400 | 359 | | | | | | |
| Sea bass: | | | | | | | | |
| Black | 31,400 | 810 | | | | | | |
| White | 11,300 | 707 | | | | | | |
| Sheepshead | 400 | 14 | | | 3,900 | 138 | | |
| Swordfish | | | | | | | 64,800 | 8,262 |
| Tuna and tunalike fishes: | | | | | | | | |
| Bluefin | 51,200 | 2,363 | 900 | 41 | | | | |
| Bonito | 372,600 | 8,353 | 191,800 | 4,299 | | | | |
| Yellowfin | 19,300 | 970 | | | | | | |
| Whitefish | 15,900 | 734 | | | | | | |
| Yellowtail | 47,700 | 1,243 | 5,600 | 147 | | | | |
| Total | 2,411,500 | 38,614 | 205,700 | 4,661 | 66,400 | 2,788 | 105,100 | 9,885 |
| SHELLFISH | | | | | | | | |
| Sea crawfish or spiny lobster | | | | | 70,600 | 11,100 | | |
| Grand total | 2,411,500 | 38,614 | 205,700 | 4,661 | 137,000 | 13,888 | 105,100 | 9,885 |

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro district.

*Fisheries of the San Diego district of California, 1934*—Continued

CATCH OFF LATIN AMERICA: BY GEAR

| Species | Purse seines | | Lampara and ring nets | | Gill nets | | Trammel nets | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | | | | | 38,600 | $2,554 | | |
| Flounders, "California halibut" | | | | | | | 285,500 | $20,443 |
| Grayfish | | | | | 3,400 | 36 | 400 | 4 |
| Herring | | | | | 2,700 | 21 | | |
| Perch | | | 300 | $6 | | | | |
| Pilchard | | | 2,500 | 39 | | | | |
| Rock bass | | | | | 400 | 14 | 200 | 7 |
| Rockfishes | | | | | | | 300 | 16 |
| Sea bass: | | | | | | | | |
| Black | | | | | 5,600 | 233 | 1,600 | 69 |
| White | | | | | 222,200 | 15,533 | | |
| Sheepshead | | | | | | | 300 | 8 |
| Smelt | | | 600 | 32 | 600 | 33 | | |
| Tuna and tunalike fishes, yellowfin | 791,400 | $39,571 | | | | | | |
| Yellowtail | | | | | 1,600 | 43 | | |
| Total | 791,400 | 39,571 | 3,400 | 77 | 275,100 | 18,467 | 288,300 | 20,547 |
| SHELLFISH | | | | | | | | |
| Sea crawfish or spiny lobster | | | | | | | 1,200 | 164 |
| Grand total | 791,400 | 39,571 | 3,400 | 77 | 275,100 | 18,467 | 289,500 | 20,711 |

| Species | Lines | | | | Traps | | Harpoons | |
|---|---|---|---|---|---|---|---|---|
| | Set and hand | | Troll | | | | | |
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Barracuda | 154,500 | $10,230 | 45,500 | $3,012 | | | | |
| Cabrilla | 163,500 | 6,451 | | | | | | |
| Flounders, "California halibut" | 800 | 57 | | | | | | |
| Grayfish | 800 | 8 | | | | | | |
| Groupers | 21,500 | 1,001 | | | | | | |
| Mackerel | 266,200 | 1,536 | | | | | | |
| Marlin | | | | | | | 3,400 | $142 |
| Rock bass | 53,000 | 1,846 | | | 2,200 | $77 | | |
| Rockfishes | 182,400 | 8,052 | | | | | | |
| Sablefish | 1,100 | 23 | | | | | | |
| Sea bass: | | | | | | | | |
| Black | 322,700 | 13,592 | | | | | | |
| White | 37,900 | 2,643 | | | | | | |
| Sheepshead | 1,200 | 33 | | | | | | |
| Smelt | 100 | 6 | | | | | | |
| Spanish mackerel | 3,700 | 73 | | | | | | |
| Swordfish | | | | | | | 6,100 | 832 |
| Tuna and tunalike fishes: | | | | | | | | |
| Bluefin | 49,600 | 2,318 | | | | | | |
| Bonito | 161,400 | 3,624 | 4,000 | 89 | | | | |
| Skipjack, or striped tuna | 11,021,300 | 441,043 | | | | | | |
| Yellowfin | 40,650,500 | 2,037,986 | | | | | | |
| Whitefish | 27,400 | 1,364 | | | | | | |
| Yellowtail | 1,111,900 | 30,746 | 1,000 | 27 | | | | |
| Total | 54,231,500 | 2,562,641 | 50,500 | 3,128 | 2,200 | 77 | 9,500 | 974 |
| SHELLFISH | | | | | | | | |
| Sea crawfish or spiny lobster | | | | | 703,800 | 100,750 | | |
| Turtles | | | | | | | 3,400 | 162 |
| Total | | | | | 703,800 | 100,750 | 3,400 | 162 |
| Grand total | 54,231,500 | 2,562,641 | 50,500 | 3,128 | 706,000 | 100,827 | 12,900 | 1,136 |

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro district.

## HALIBUT FISHERY OF THE PACIFIC COAST

The halibut fishery of the Pacific coast, which is prosecuted by United States (including Alaska) and Canadian vessels, ranks as one of the foremost fisheries of that section. During 1934, the total catch of halibut by vessels of both nationalities amounted to 46,018,000 pounds, valued at $2,963,000. This is an increase of less than one-half of 1 percent in volume and 15 percent in value as compared with the catch and its value in 1933. Of the total catch in 1934, 79 percent was taken by United States craft and 21 percent by Canadian craft. Considered according to ports of landing, 44 percent was landed at ports in the State of Washington; 40 percent at Canadian ports; and 16 percent at ports in Alaska.

NOTE.—These statistics are compiled from data collected by the International Fisheries Commission for Washington and British Columbia, and by Bureau agents for Alaska. The weights of the above species represent the fish after evisceration and removal of heads.

*Halibut fishery of the Pacific coast, 1934*

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

| Item | Washington fleet | Alaska fleet | Total |
|---|---|---|---|
| Regular halibut vessels: | | | |
| Number | 134 | 92 | 226 |
| Net tonnage | 3,945 | 1,636 | 5,581 |
| Crew | 963 | 461 | 1,424 |
| Dories [1] | 13 | | 13 |
| Skates of lines | 3,824 | 2,082 | 5,906 |
| Vessels in other fisheries, but landing 1 or more fares of halibut: | | | |
| Number | 15 | 13 | 28 |
| Net tonnage | 266 | 98 | 364 |
| Crew | 73 | 40 | 113 |
| Skates of lines | 284 | 189 | 473 |
| Regular halibut boats: | | | |
| Number | | 32 | 32 |
| Crew | | 65 | 65 |
| Skates of lines | | 416 | 416 |
| Boats in other fisheries, but landing 1 or more fares of halibut: | | | |
| Number | 2 | 78 | 80 |
| Crew | 6 | 128 | 134 |
| Skates of lines | 24 | 410 | 434 |

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS

| Fleet classification | Landed in— | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Washington | | British Columbia | | Alaska | | | |
| WASHINGTON FLEET | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Regular vessels: | | | | | | | | |
| Halibut | 18,840,728 | $1,398,203 | 2,634,440 | $165,286 | 1,215,610 | $69,843 | 22,690,778 | $1,633,332 |
| Sablefish | 2,187,108 | 83,215 | 2,018 | 65 | 9,118 | 375 | 2,198,244 | 83,655 |
| "Lingcod" | 682,021 | 23,482 | | | | | 682,021 | 23,482 |
| Rockfishes | 376,253 | 14,602 | | | | | 376,253 | 14,602 |
| Total | 22,086,110 | 1,519,502 | 2,636,458 | 165,351 | 1,224,728 | 70,218 | 25,947,296 | 1,755,071 |
| Other vessels and boats: | | | | | | | | |
| Halibut | 387,603 | 28,881 | | | | | 387,603 | 28,881 |
| Sablefish | 22,553 | 838 | | | | | 22,553 | 838 |
| "Lingcod" | 48,387 | 1,107 | | | | | 48,387 | 1,107 |
| Rockfishes | 10,265 | 257 | | | | | 10,265 | 257 |
| Total | 468,808 | 31,083 | | | | | 468,808 | 31,083 |

[1] The dories shown are those which actually engage in fishing. In previous figures lifeboats were also included.

*Halibut fishery of the Pacific coast, 1934*—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS—Continued

| Fleet classification | Landed in— Washington | | British Columbia | | Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| ALASKA FLEET | | | | | | | | |
| Regular vessels: | | | | | | | | |
| Halibut | 1,329,811 | $95,153 | 5,851,433 | $374,892 | 4,188,010 | $230,604 | 11,369,254 | $700,649 |
| Sablefish | 49,758 | 1,948 | 27,445 | 460 | 149,442 | 3,786 | 226,645 | 6,194 |
| "Lingcod" | 6,612 | 311 | | | 39,000 | 1,170 | 45,612 | 1,481 |
| Rockfishes | 2,501 | 130 | | | 566 | 12 | 3,067 | 142 |
| Total | 1,388,682 | 97,542 | 5,878,878 | 375,352 | 4,377,018 | 235,572 | 11,644,578 | 708,466 |
| Other vessels and boats: | | | | | | | | |
| Halibut | | | 104,035 | 6,246 | 1,748,049 | 97,890 | 1,852,084 | 104,136 |
| Sablefish | | | | | 4,460 | 136 | 4,460 | 136 |
| Total | | | 104,035 | 6,246 | 1,752,509 | 98,026 | 1,856,544 | 104,272 |
| COMBINED FLEETS | | | | | | | | |
| Regular vessels: | | | | | | | | |
| Halibut | 20,170,539 | 1,493,356 | 8,485,873 | 540,178 | 5,403,620 | 300,447 | 34,060,032 | 2,333,981 |
| Sablefish | 2,236,866 | 85,163 | 29,463 | 525 | 158,560 | 4,161 | 2,424,889 | 89,849 |
| "Lingcod" | 688,633 | 23,793 | | | 39,000 | 1,170 | 727,633 | 24,963 |
| Rockfishes | 378,754 | 14,732 | | | 566 | 12 | 379,320 | 14,744 |
| Total | 23,474,792 | 1,617,044 | 8,515,336 | 540,703 | 5,601,746 | 305,790 | 37,591,874 | 2,463,537 |
| Other vessels and boats: | | | | | | | | |
| Halibut | 387,603 | 28,881 | 104,035 | 6,246 | 1,748,049 | 97,890 | 2,239,687 | 133,017 |
| Sablefish | 22,553 | 838 | | | 4,460 | 136 | 27,013 | 974 |
| "Lingcod" | 48,387 | 1,107 | | | | | 48,387 | 1,107 |
| Rockfishes | 10,265 | 257 | | | | | 10,265 | 257 |
| Total | 468,808 | 31,083 | 104,035 | 6,246 | 1,752,509 | 98,026 | 2,325,352 | 135,355 |
| All vessels and boats: | | | | | | | | |
| Halibut | 20,558,142 | 1,522,237 | 8,589,908 | 546,424 | 7,151,669 | 398,337 | 36,299,719 | 2,466,998 |
| Sablefish | 2,259,419 | 86,001 | 29,463 | 525 | 163,020 | 4,297 | 2,451,902 | 90,823 |
| "Lingcod" | 737,020 | 24,900 | | | 39,000 | 1,170 | 776,020 | 26,070 |
| Rockfishes | 389,019 | 14,989 | | | 566 | 12 | 389,585 | 15,001 |
| Grand total | 23,943,600 | 1,648,127 | 8,619,371 | 546,949 | 7,354,255 | 403,816 | 39,917,226 | 2,598,892 |

CATCH OF HALIBUT: BY UNITED STATES AND CANADIAN VESSELS AND BOATS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

| Fleet classification | Landed in— Washington | | British Columbia | | Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| WASHINGTON FLEET | | | | | | | | |
| Regular halibut vessels | 18,841 | 1,398 | 2,634 | 165 | 1,216 | 70 | 22,691 | 1,633 |
| Other vessels and boats | 388 | 29 | | | | | 388 | 29 |
| Total | 19,229 | 1,427 | 2,634 | 165 | 1,216 | 70 | 23,079 | 1,662 |
| ALASKA FLEET | | | | | | | | |
| Regular halibut vessels | 1,330 | 95 | 5,851 | 375 | 4,188 | 231 | 11,369 | 701 |
| Other vessels and boats | | | 104 | 6 | 1,748 | 98 | 1,852 | 104 |
| Total | 1,330 | 95 | 5,955 | 381 | 5,936 | 329 | 13,221 | 805 |
| COMBINED FLEETS | | | | | | | | |
| Regular halibut vessels | 20,171 | 1,493 | 8,485 | 540 | 5,404 | 301 | 34,060 | 2,334 |
| Other vessels and boats | 388 | 29 | 104 | 6 | 1,748 | 98 | 2,240 | 133 |
| Total | 20,559 | 1,522 | 8,589 | 546 | 7,152 | 399 | 36,300 | 2,467 |
| British Columbia fleet | | | 9,718 | 496 | | | 9,718 | 496 |
| Grand total | 20,559 | 1,522 | 18,307 | 1,042 | 7,152 | 399 | 46,018 | 2,963 |

NOTE.—In addition to the above it is estimated that about 850,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $175,000, were landed at Pacific coast ports during 1934.

## VESSEL FISHERIES AT SEATTLE, WASH.

A total of 44,363,035 pounds of fishery products, valued at $2,754,-582, were handled by Seattle wholesale dealers during 1934, exclusive of quantities received by transporting vessels or by rail from Alaska or Canada. This represents an increase of 2 percent in volume and 13 percent in value as compared with the volume and value of the products handled during the preceding year. Of the total quantity handled, 23,943,600 pounds, valued at $1,648,127, were landed by fishing vessels—a decrease of 1 percent in volume but an increase of 10 percent in value as compared with the previous year. Receipts by wholesale dealers from sources other than Alaska or Canada or from vessels in the halibut fleet, amounted to 20,419,435 pounds, valued at $1,106,455, which is an increase of 6 percent in volume and 16 percent in value.

*Fishery products landed by United States vessels at Seattle, Wash., 1934* [1]

BY FISHING GROUNDS

| Fishing grounds | Trips | Halibut | | | | Sablefish | | "Lingcod" | | Rockfishes | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | | No. 2 | | | | | | | | | |
| | *Number* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| West of Cape Spencer | 446 | 8, 868, 923 | $686, 348 | 5, 504, 626 | $364, 710 | 31, 350 | $1, 037 | 3, 679 | $117 | 17, 409 | $472 | 14, 425, 987 | $1, 052, 784 |
| South of Cape Spencer | 710 | 3, 025, 896 | 265, 495 | 3, 158, 697 | 205, 684 | 2, 228, 069 | 84, 964 | 733, 341 | 24, 783 | 371, 610 | 14, 417 | 9, 517, 613 | 595, 343 |
| Total | 1, 156 | 11, 894, 819 | 951, 843 | 8, 663, 323 | 570, 394 | 2, 259, 419 | 86, 001 | 737, 020 | 24, 900 | 389, 019 | 14, 989 | 23, 943, 600 | 1, 648, 127 |

BY MONTHS

| Months | Trips | Halibut | | | | Sablefish | | "Lingcod" | | Rockfishes | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | | No. 2 | | | | | | | | | |
| | *Number* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| January | 13 | | | | | | | 51, 340 | $3, 215 | 29, 044 | $1, 811 | 80, 384 | $5, 026 |
| February | 32 | | | | | 2, 141 | $170 | 166, 445 | 5, 367 | 104, 373 | 3, 452 | 272, 959 | 8, 989 |
| March | 137 | 2, 077, 200 | $147, 462 | 956, 492 | $54, 415 | 31, 608 | 995 | 49, 011 | 1, 662 | 19, 551 | 760 | 3, 133, 862 | 205, 294 |
| April | 134 | 1, 544, 667 | 128, 682 | 991, 925 | 63, 414 | 11, 945 | 367 | 80, 356 | 1, 985 | 19, 601 | 428 | 2, 648, 494 | 194, 876 |
| May | 157 | 1, 865, 382 | 148, 222 | 1, 279, 186 | 78, 060 | 13, 365 | 672 | 89, 452 | 1, 884 | 19, 716 | 467 | 3, 267, 101 | 229, 305 |
| June | 128 | 1, 571, 579 | 122, 771 | 1, 253, 827 | 78, 511 | 78, 579 | 3, 758 | 42, 497 | 878 | 6, 137 | 164 | 2, 952, 619 | 206, 082 |
| July | 109 | 1, 157, 563 | 89, 562 | 999, 470 | 60, 908 | 151, 954 | 5, 524 | 15, 031 | 294 | 6, 640 | 197 | 2, 330, 658 | 156, 485 |
| August | 124 | 1, 435, 452 | 103, 102 | 1, 359, 234 | 88, 466 | 129, 276 | 4, 736 | 14, 839 | 435 | 16, 376 | 492 | 2, 955, 177 | 197, 231 |
| September | 97 | 845, 686 | 82, 134 | 881, 048 | 72, 039 | 539, 094 | 22, 742 | 15, 502 | 506 | 32, 198 | 1, 272 | 2, 313, 528 | 178, 693 |
| October | 117 | 789, 135 | 83, 512 | 439, 669 | 38, 672 | 1, 054, 128 | 38, 246 | 37, 066 | 1, 561 | 23, 991 | 1, 070 | 2, 343, 989 | 163, 061 |
| November | 83 | 608, 155 | 46, 396 | 502, 472 | 35, 909 | 218, 484 | 7, 564 | 36, 207 | 1, 764 | 38, 426 | 2, 073 | 1, 403, 744 | 93, 706 |
| December | 25 | | | | | 28, 845 | 1, 227 | 139, 274 | 5, 349 | 72, 966 | 2, 803 | 241, 085 | 9, 379 |
| Total | 1, 156 | 11, 894, 819 | 951, 843 | 8, 663, 323 | 570, 394 | 2, 259, 419 | 86, 001 | 737, 020 | 24, 900 | 389, 019 | 14, 989 | 23, 943, 600 | 1, 648, 127 |

[1] Halibut fleet.

*Fishery products received by Seattle wholesale dealers, 1934; by months* [1]

| Species | January | | February | | March | | April | | May | | June | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders: | | | | | | | | | | | | |
| "Sole" | 68,146 | $2,346 | 63,477 | $2,513 | 77,702 | $3,121 | 110,187 | $3,857 | 88,002 | $3,113 | 110,934 | $3,305 |
| Other | 4,794 | 102 | 6,297 | 150 | 1,964 | 65 | 182 | 4 | 618 | 6 | 167 | 2 |
| Halibut | | | | | 2,900 | 290 | 938 | 84 | 18,853 | 1,295 | 40,003 | 2,395 |
| Herring | 12,680 | 242 | 127,815 | 750 | 71,800 | 359 | 29,500 | 147 | | | | |
| "Lingcod" | 21,285 | 1,053 | 31,194 | 1,082 | 38,314 | 1,247 | 21,374 | 639 | 31,608 | 765 | 36,180 | 641 |
| Perch | 1,371 | 34 | 4,251 | 134 | 8,228 | 188 | 6,910 | 158 | 3,067 | 68 | 1,039 | 21 |
| Rockfishes | 28,349 | 1,193 | 13,527 | 339 | 15,146 | 327 | 10,136 | 293 | 14,027 | 327 | 8,936 | 180 |
| Salmon: | | | | | | | | | | | | |
| Blueback, red or sockeye | | | | | | | | | | | 12,119 | 848 |
| Chinook or king | 3,742 | 524 | 29,283 | 4,231 | 23,019 | 3,430 | 72,521 | 7,978 | 767,767 | 68,315 | 1,757,107 | 158,078 |
| Chum or keta | | | | | | | | | 65 | 2 | 356 | 9 |
| Silver or coho | | | | | | | | | 46,991 | 2,926 | 502,934 | 32,681 |
| Smelt | 36,585 | 1,510 | 49,848 | 1,303 | 53,450 | 1,915 | 578 | 35 | 5,125 | 242 | 20,233 | 1,012 |
| Crabs | 47,334 | 3,214 | 78,129 | 5,285 | 68,019 | 4,848 | 57,426 | 3,664 | 58,447 | 2,876 | 17,260 | 1,183 |
| Octopus | 2,099 | 84 | 3,868 | 154 | 5,847 | 177 | 5,350 | 214 | 5,724 | 173 | 4,439 | 133 |
| Total | 226,385 | 10,302 | 407,689 | 15,941 | 366,389 | 15,967 | 315,102 | 17,073 | 1,040,294 | 80,108 | 2,502,707 | 200,488 |

| Species | July | | August | | September | | October | | November | | December | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Flounders: | | | | | | | | | | | | | | |
| "Sole" | 77,086 | $2,314 | 82,276 | $2,642 | 85,073 | $2,550 | 62,787 | $2,060 | 43,959 | $1,445 | 93,855 | $2,999 | 954,484 | $32,265 |
| Other | 30 | 1 | 344 | 3 | 592 | 8 | 408 | 5 | 589 | 12 | 8,924 | 179 | 24,909 | 537 |
| Halibut | 63,692 | 3,818 | 20,985 | 1,262 | 1,327 | 106 | | | | | | | 148,698 | 9,250 |
| Herring | | | | | | | | | | | | | 241,795 | 1,498 |
| "Lingcod" | 55,342 | 1,092 | 51,639 | 1,323 | 20,509 | 538 | 13,246 | 449 | 8,537 | 326 | 16,645 | 666 | 345,873 | 9,821 |
| Perch | 3,890 | 102 | 5,942 | 120 | 5,161 | 103 | 8,372 | 242 | 3,428 | 113 | 9,225 | 280 | 60,884 | 1,563 |
| Rockfishes | 15,531 | 324 | 4,967 | 145 | 12,511 | 330 | 12,534 | 293 | 11,471 | 331 | 26,170 | 690 | 173,305 | 4,772 |
| Sablefish | 3,370 | 177 | 5,280 | 211 | 3,895 | 136 | | | | | | | 12,545 | 524 |
| Salmon: | | | | | | | | | | | | | | |
| Blueback, red or sockeye | 18,700 | 1,411 | 19,751 | 1,635 | 1,624 | 103 | 399 | 29 | | | | | 52,593 | 4,026 |
| Chinook or king | 1,795,126 | 141,967 | 2,034,779 | 154,021 | 489,482 | 30,624 | 195,572 | 14,601 | 20,393 | 1,716 | | | 7,188,791 | 585,485 |
| Chum or keta | 795 | 24 | 31,923 | 908 | 118,447 | 2,753 | 2,808,616 | 69,279 | 902,898 | 21,757 | 933 | 28 | 3,864,033 | 94,760 |
| Humpback or pink | 985 | 20 | 4,143 | 83 | | | | | | | | | 5,128 | 103 |
| Silver or coho | 1,021,544 | 52,957 | 1,515,935 | 75,189 | 1,493,893 | 67,673 | 1,526,261 | 64,278 | 126,965 | 6,117 | 5,156 | 361 | 6,239,679 | 302,182 |
| Smelt | 43,292 | 1,666 | 35,080 | 1,370 | 60,422 | 2,317 | 80,310 | 3,365 | 24,189 | 866 | 30,719 | 1,447 | 439,831 | 17,048 |
| Crabs | 25,410 | 2,204 | 12,560 | 1,162 | 2,980 | 186 | 70,392 | 4,628 | 72,426 | 6,144 | 91,588 | 5,062 | [2] 601,971 | 40,456 |
| Octopus | 5,810 | 174 | 5,340 | 161 | 5,896 | 177 | 8,207 | 267 | 4,092 | 122 | 8,244 | 329 | 64,916 | 2,165 |
| Total | 3,130,603 | 208,251 | 3,830,944 | 240,235 | 2,301,812 | 107,604 | 4,787,104 | 159,496 | 1,218,947 | 38,949 | 291,459 | 12,041 | 20,419,435 | 1,106,455 |

[1] This tabulation does not include fish received from Alaska or Canada or vessels in the halibut fleet.

[2] 29,174 dozen.

## LAKE FISHERIES [12]

In 1934 the yield of the fisheries of the Great Lakes including those of the international lakes of northern Minnesota, in the United States and Canada amounted to 124,148,400 pounds, representing an increase of 23 percent as compared with the catch in the preceding year.

Considering the fishery of United States craft only, the catch amounted to 96,411,200 pounds, valued at $5,123,735, which is an increase of 29 percent in volume and 26 percent in value as compared with the catch in the previous year. These fisheries gave employment to 7,579 fishermen or 9 percent more than in 1932 when the first preceding survey of employment was made.

During the survey for 1934 data, statistics of the catch in 1933 also were collected. These are presented following the data for 1934:

*Lake fisheries of the United States and Canada, 1934*

CATCH: BY LAKES

| Species | Lake Ontario | | | Lake Erie | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Blue pike | 152,700 | 67,600 | 220,300 | 8,356,100 | 2,297,900 | 10,654,000 |
| Bowfin | 500 | (1) | 500 | 5,400 | (1) | 5,400 |
| Burbot | 7,500 | (1) | 7,500 | 252,800 | (1) | 252,800 |
| Carp | 17,000 | 81,600 | 98,600 | 1,480,500 | 610,300 | 2,090,800 |
| Catfish and bullheads | 72,300 | 168,500 | 240,800 | 567,600 | 71,900 | 639,500 |
| Cisco | | | | 111,000 | 236,300 | 347,300 |
| Eels | 64,900 | 51,700 | 116,600 | 400 | 2,300 | 2,700 |
| Goldfish | | | | 67,800 | (1) | 67,800 |
| Lake herring | 126,300 | 609,100 | 735,400 | | | |
| Lake trout | 13,600 | 256,200 | 269,800 | 1,200 | 2,600 | 3,800 |
| Mooneye | | | | 24,900 | (1) | 24,900 |
| Pike or pickerel (jacks) | 14,900 | 140,400 | 155,300 | 500 | 19,900 | 20,400 |
| Rock bass | 5,600 | (1) | 5,600 | 3,200 | (1) | 3,200 |
| Sauger | | | | 785,300 | (1) | 785,300 |
| Sheepshead | | | | 2,218,200 | (1) | 2,218,200 |
| Sturgeon | 16,400 | 3,500 | 19,900 | 18,500 | 25,500 | 44,000 |
| Sucker "mullet" | 47,300 | (1) | 47,300 | 1,016,700 | (1) | 1,016,700 |
| Sunfish | 17,900 | (1) | 17,900 | | | |
| White bass | | | | 687,700 | (1) | 687,700 |
| Whitefish: | | | | | | |
| Common | 83,600 | 489,500 | 573,100 | 777,400 | 915,900 | 1,693,300 |
| Menominee | 200 | (1) | 200 | | | |
| Yellow perch | 51,400 | 118,200 | 169,600 | 14,219,400 | 5,671,000 | 19,890,400 |
| Yellow pike | 24,500 | 28,600 | 53,100 | 1,245,900 | 292,700 | 1,538,600 |
| Mussel shells | | | | 968,700 | (1) | 968,700 |
| Miscellaneous | | 244,700 | 244,700 | | 1,354,400 | 1,354,400 |
| Total | 716,600 | 2,259,600 | 2,976,200 | 32,809,200 | 11,500,700 | 44,309,900 |

[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

[12] The statistics of the catch presented herewith were obtained principally from the records of the various State fishery agencies and from the Dominion Bureau of Statistics, Ottawa, Canada. The data for the operating units (fishermen, vessels, boats, and gear) of the United States were obtained largely by Bureau agents in a special canvass; although State records in several instances were very helpful in this work. In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for 2 seasons. For Lake of the Woods the seasons are from June 1 to Nov. 1 and Dec. 1 to Apr. 1 and for Rainy and Namakan Lakes from May 15 to Nov. 1 and Dec. 1 to Apr. 1. The catches for these 2 seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between Jan. 1 and Apr. 1 is estimated at less than 3 percent of the total catch.

*Lake fisheries of the United States and Canada, 1934*—Continued

CATCH: BY LAKES—Continued

| Species | Lake Huron | | | Lake Michigan | Lake Superior | | |
|---|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Blue pike | | 1,400 | 1,400 | | | | |
| Bowfin | 3,100 | (1) | 3,100 | | | | |
| Buffalofish | | | | 1,000 | | | |
| Burbot | 2,100 | (1) | 2,100 | 40,600 | 1,800 | (1) | 1,800 |
| Carp | 1,015,200 | 44,200 | 1,059,400 | 1,321,100 | 1,400 | 300 | 1,700 |
| Catfish and bullheads | 50,800 | 3,600 | 54,400 | 52,200 | 300 | (1) | 300 |
| Chubs | 413,700 | 448,700 | 862,400 | 6,262,200 | 472,800 | 407,000 | 879,800 |
| Lake herring | 4,371,300 | 273,900 | 4,645,200 | 6,412,400 | 13,030,700 | 1,749,900 | 14,780,600 |
| Lake trout | 1,521,500 | 3,519,900 | 5,041,400 | 5,269,100 | 3,306,300 | 1,260,700 | 4,567,000 |
| Mooneye | 300 | (1) | 300 | | | | |
| Pike or pickerel (jacks) | 7,500 | 136,700 | 144,200 | 79,900 | 5,800 | 5,600 | 11,400 |
| Rock bass | 12,800 | (1) | 12,800 | 1,400 | 200 | (1) | 200 |
| Sauger | 73,200 | (1) | 73,200 | 31,300 | 2,100 | (1) | 2,100 |
| Sheepshead | 4,300 | (1) | 4,300 | 9,300 | | | |
| Smelt | | | | 1,029,300 | | | |
| Steelhead trout | | | | 1,600 | | | |
| Sturgeon | | 22,700 | 22,700 | | | 900 | 900 |
| Sucker "mullet" | 2,198,100 | (1) | 2,198,100 | 2,062,800 | 164,700 | (1) | 164,700 |
| White bass | 100 | (1) | 100 | 100 | | | |
| Whitefish: | | | | | | | |
| Common | 2,565,800 | 1,944,800 | 4,510,600 | 2,181,800 | 493,200 | 295,200 | 788,400 |
| Menominee | 52,600 | (1) | 52,600 | 152,900 | 23,300 | (1) | 23,300 |
| Yellow perch | 519,400 | 157,400 | 676,800 | 1,256,200 | 4,700 | (1) | 4,700 |
| Yellow pike | 1,615,400 | 423,400 | 2,038,800 | 162,700 | 25,900 | 67,400 | 93,300 |
| Crawfish | | | | 35,600 | | | |
| Mussel shells | 84,400 | (1) | 84,400 | 2,081,300 | | | |
| Miscellaneous | | 564,900 | 564,900 | | | 201,200 | 201,200 |
| Total | 14,511,600 | 7,541,600 | 22,053,200 | 28,444,200 | 17,533,200 | 3,988,200 | 21,521,400 |

| Species | Namakan Lake | | | Rainy Lake | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Chubs | | | | 100 | 5,800 | 5,900 |
| Pike or pickerel (jacks) | 35,700 | 4,200 | 39,900 | 65,000 | 167,900 | 232,900 |
| Sturgeon | | 1,200 | 1,200 | 600 | 700 | 1,300 |
| Sucker "mullet" | | | | 6,900 | (1) | 6,900 |
| Whitefish, common | 19,000 | 16,700 | 35,700 | 148,100 | 31,900 | 180,000 |
| Yellow perch | 1,400 | (1) | 1,400 | 3,200 | 8,800 | 12,000 |
| Yellow pike | 44,300 | 14,400 | 58,700 | 71,100 | 207,300 | 278,400 |
| Miscellaneous | | 36,600 | 36,600 | | 105,400 | 105,400 |
| Total | 100,400 | 73,100 | 173,500 | 295,000 | 527,800 | 822,800 |

| Species | Lake of the Woods | | | Total, all lakes | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Blue pike | | 38,200 | 38,200 | 8,508,800 | 2,405,100 | 10,913,900 |
| Bowfin | | | | 9,000 | (1) | 9,000 |
| Buffalofish | | | | 1,000 | (1) | 1,000 |
| Burbot | 91,300 | (1) | 91,300 | 395,500 | (1) | 395,500 |
| Carp | 11,300 | 1,700 | 13,000 | 3,846,500 | 738,100 | 4,584,600 |
| Catfish and bullheads | 46,000 | 12,200 | 58,200 | 789,200 | 256,200 | 1,045,400 |
| Chubs | | | | 7,148,800 | 861,500 | 8,010,300 |
| Cisco | | | | 111,000 | 236,300 | 347,300 |
| Crappie | 1,000 | (1) | 1,000 | 1,000 | (1) | 1,000 |
| Eels | | | | 65,300 | 54,000 | 119,300 |
| Goldfish | | | | 67,800 | (1) | 67,800 |
| Lake herring | | | | 23,940,700 | 2,632,900 | 26,573,600 |
| Lake trout | | 23,000 | 23,000 | 10,111,700 | 5,062,400 | 15,174,100 |
| Mooneye | 500 | (1) | 500 | 25,700 | (1) | 25,700 |
| Pike or pickerel (jacks) | 349,500 | 459,400 | 808,900 | 558,800 | 934,100 | 1,492,900 |
| Rock bass | | | | 23,200 | (1) | 23,200 |
| Sauger | 282,500 | 3,700 | 286,200 | 1,174,400 | 3,700 | 1,178,100 |
| Sheepshead | | | | 2,231,800 | (1) | 2,231,800 |
| Smelt | | | | 1,029,300 | (1) | 1,029,300 |
| Steelhead trout | | | | 1,600 | (1) | 1,600 |
| Sturgeon | 1,000 | 300 | 1,300 | 36,500 | 54,800 | 91,300 |
| Sucker "mullet" | 120,000 | 300 | 120,300 | 5,616,500 | 300 | 5,616,800 |

[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

*Lake fisheries of the United States and Canada, 1934*—Continued

CATCH: BY LAKES—Continued

| Species | Lake of the Woods | | | Total, all lakes | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Sunfish | | | | 17, 900 | (1) | 17, 900 |
| Tullibees | 155, 500 | 81, 300 | 236, 800 | 155, 500 | 81, 300 | 236, 800 |
| White bass | | | | 687, 900 | (1) | 687, 900 |
| Whitefish: | | | | | | |
| Common | 7, 100 | 336, 800 | 343, 900 | 6, 276, 000 | 4, 030, 800 | 10, 306, 800 |
| Menominee | | | | 229, 000 | (1) | 229, 000 |
| Yellow perch | 43, 700 | 7, 300 | 51, 000 | 16, 099, 400 | 5, 962, 700 | 22, 062, 100 |
| Yellow pike | 891, 600 | 830, 700 | 1, 722, 300 | 4, 081, 400 | 1, 864, 500 | 5, 945, 900 |
| Crawfish | | | | 35, 600 | (1) | 35, 600 |
| Mussel shells | | | | 3, 134, 400 | (1) | 3, 134, 400 |
| Miscellaneous | | 51, 300 | 51, 300 | | 2, 558, 500 | 2, 558, 500 |
| Total | 2, 001, 000 | 1, 846, 200 | 3, 847, 200 | 96, 411, 200 | 27, 737, 200 | 124, 148, 400 |

[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

*Lake fisheries of the United States, 1934*

OPERATING UNITS: BY LAKES

| Item | Lake Ontario | Lake Erie | Lake Huron | Lake Michigan | Lake Superior | Lake of the Woods, Rainy Lake, and Namakan Lake | Total |
|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 11 | 275 | 248 | 1, 038 | 131 | | 1, 703 |
| On boats and shore: | | | | | | | |
| Regular | 111 | 731 | 887 | 968 | 729 | 103 | 3, 529 |
| Casual | 83 | 498 | 158 | 1, 266 | 342 | | 2, 347 |
| Total | 205 | 1, 504 | 1, 293 | 3, 272 | 1, 202 | 103 | 7, 579 |
| Vessels: | | | | | | | |
| Steam | | 22 | 9 | 39 | 6 | | 76 |
| Net tonnage | | 602 | 125 | 874 | 115 | | 1, 716 |
| Motor | 3 | 33 | 52 | 291 | 35 | | 414 |
| Net tonnage | 42 | 285 | 640 | 3, 313 | 301 | | 4, 581 |
| Total vessels | 3 | 55 | 61 | 330 | 41 | | 490 |
| Total net tonnage | 42 | 887 | 765 | 4, 187 | 416 | | 6, 297 |
| Boats: | | | | | | | |
| Motor | 67 | 276 | 299 | 704 | 295 | 79 | 1, 720 |
| Other | 61 | 210 | 125 | 527 | 421 | 6 | 1, 350 |
| Accessory boats | | | 3 | 12 | 3 | | 18 |
| Apparatus: | | | | | | | |
| Haul seines | 3 | 130 | 63 | 48 | 10 | | 254 |
| Length, yards | 260 | 56, 531 | 27, 258 | 13, 066 | 1, 233 | | 98, 348 |
| Gill nets: | | | | | | | |
| "Shoal", 2¼ to 3⅞ inches | 1, 962 | 14, 275 | 2, 115 | 22, 198 | 6, 504 | | 47, 054 |
| Square yards | 242, 650 | 1, 871, 367 | 576, 860 | 4, 711, 827 | 1, 628, 075 | | 9, 030, 779 |
| "Shoal", 4 to 6 inches | 379 | 6, 661 | 5, 823 | 29, 930 | 7, 921 | 244 | 50, 958 |
| Square yards | 73, 050 | 1, 606, 510 | 1, 606, 150 | 8, 030, 696 | 2, 299, 188 | 77, 940 | 13, 693, 534 |
| Trammel nets | | 116 | | 7 | | | 123 |
| Square yards | | 4, 640 | | 660 | | | 5, 300 |
| Lines: | | | | | | | |
| Troll | | | | | 31 | | 31 |
| Hooks | | | | | 31 | | 31 |
| Trot | 63 | 39 | 361 | 643 | 1, 203 | | 2, 309 |
| Hooks | 32, 010 | 5, 750 | 135, 600 | 291, 610 | 261, 985 | | 726, 955 |
| Pound nets | | 34 | 394 | 735 | 110 | 70 | 1, 343 |
| Trap nets | 192 | 3, 986 | 2, 778 | 601 | 108 | | 7, 665 |
| Fyke nets | 113 | 802 | 339 | 1, 429 | 45 | 93 | 2, 821 |
| Crawfish pots | | | | 2, 710 | | | 2, 710 |
| Crowfoot bars | | 4 | 5 | 676 | | | 685 |
| Picks | | 3 | 7 | 132 | | | 142 |
| Diving outfits | | | | 16 | | | 16 |

*Lake fisheries of the United States, 1934*—Continued

OPERATING UNITS: By States and lakes

| Item | New York | | | Pennsylvania | Ohio |
|---|---|---|---|---|---|
| | Lake Ontario | Lake Erie | Total | Lake Erie | Lake Erie |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 11 | 67 | 78 | 111 | 97 |
| On boats and shore: | | | | | |
| Regular | 111 | 2 | 113 | 41 | 567 |
| Casual | 83 | 8 | 91 | 56 | 347 |
| Total | 205 | 77 | 282 | 208 | 1,011 |
| Vessels: | | | | | |
| Steam | | 4 | 4 | 12 | 6 |
| Net tonnage | | 94 | 94 | 307 | 201 |
| Motor | 3 | 11 | 14 | 9 | 13 |
| Net tonnage | 42 | 75 | 117 | 80 | 130 |
| Total vessels | 3 | 15 | 18 | 21 | 19 |
| Total net tonnage | 42 | 169 | 211 | 387 | 331 |
| Boats: | | | | | |
| Motor | 67 | 2 | 69 | 26 | 216 |
| Other | 61 | 7 | 68 | 41 | 100 |
| Apparatus: | | | | | |
| Haul seines | 3 | | 3 | 11 | 78 |
| Length, yards | 260 | | 260 | 1,210 | 43,672 |
| Gill nets: | | | | | |
| "Shoal", 2¼ to 3⅞ inches | 1,962 | 1,544 | 3,506 | 5,762 | 6,934 |
| Square yards | 242,650 | 207,060 | 449,710 | 646,633 | 1,013,154 |
| "Shoal", 4 to 6 inches | 379 | 2,342 | 2,721 | 3,542 | 760 |
| Square yards | 73,050 | 579,490 | 652,540 | 903,620 | 120,000 |
| Trammel nets | | | | | 116 |
| Square yards | | | | | 4,640 |
| Lines: | | | | | |
| Trot | 63 | 2 | 65 | 32 | |
| Hooks | 32,010 | 350 | 32,360 | 4,800 | |
| Pound nets | | | | 28 | 6 |
| Trap nets | 192 | | 192 | 67 | 3,798 |
| Fyke nets | 113 | | 113 | | 243 |

| Item | Michigan | | | | | Indiana |
|---|---|---|---|---|---|---|
| | Lake Erie | Lake Huron | Lake Michigan | Lake Superior | Total | Lake Michigan |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | 248 | 454 | 92 | 794 | 18 |
| On boats and shore: | | | | | | |
| Regular | 121 | 887 | 514 | 327 | 1,849 | 23 |
| Casual | 87 | 158 | 637 | 92 | 974 | 61 |
| Total | 208 | 1,293 | 1,605 | 511 | 3,617 | 102 |
| Vessels: | | | | | | |
| Steam | | 9 | 19 | 6 | 34 | 1 |
| Net tonnage | | 125 | 338 | 115 | 578 | 22 |
| Motor | | 52 | 116 | 20 | 188 | 4 |
| Net tonnage | | 640 | 1,155 | 166 | 1,961 | 57 |
| Total vessels | | 61 | 135 | 26 | 222 | 5 |
| Total net tonnage | | 765 | 1,493 | 281 | 2,539 | 79 |
| Boats: | | | | | | |
| Motor | 32 | 299 | 408 | 170 | 909 | 56 |
| Other | 62 | 125 | 315 | 47 | 549 | 1 |
| Accessory boats | | 3 | 11 | 2 | 16 | |
| Apparatus: | | | | | | |
| Haul seines | 41 | 63 | | 10 | 114 | |
| Length, yards | 11,649 | 27,258 | | 1,233 | 40,140 | |
| Gill nets: | | | | | | |
| "Shoal", 2¼ to 3⅞ inches | 35 | 2,115 | 5,531 | 2,030 | 9,711 | 848 |
| Square yards | 4,520 | 576,860 | 1,142,134 | 318,845 | 2,042,359 | 200,968 |
| "Shoal", 4 to 6 inches | 17 | 5,823 | 17,326 | 4,746 | 27,912 | 687 |
| Square yards | 3,400 | 1,606,150 | 4,569,611 | 1,302,073 | 7,481,234 | 206,240 |
| Lines: | | | | | | |
| Troll | | | | 31 | 31 | |
| Hooks | | | | 31 | 31 | |
| Trot | 5 | 361 | 165 | 747 | 1,278 | |
| Hooks | 600 | 135,600 | 132,610 | 219,260 | 488,070 | |
| Pound nets | | 394 | 437 | 49 | 880 | 5 |
| Trap nets | 121 | 2,778 | 601 | 108 | 3,608 | |
| Fyke nets | 559 | 339 | 56 | 35 | 989 | |
| Crowfoot bars | 4 | 5 | 596 | | 605 | 42 |
| Picks | 3 | 7 | 132 | | 142 | |
| Diving outfits | | | 16 | | 16 | |

*Lake fisheries of the United States, 1934*—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

| Item | Illinois | Wisconsin | | | Minnesota | | |
|---|---|---|---|---|---|---|---|
| | Lake Michigan | Lake Michigan | Lake Superior | Total | Lake Superior | Lake of the Woods, Rainy Lake, and Namakan Lake | Total |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | 72 | 494 | 39 | 533 | -------- | -------- | -------- |
| On boats and shore: | | | | | | | |
| Regular | 9 | 422 | 107 | 529 | 295 | 103 | 398 |
| Casual | -------- | 568 | 86 | 654 | 164 | -------- | 164 |
| Total | 81 | 1,484 | 232 | 1,716 | 459 | 103 | 562 |
| Vessels: | | | | | | | |
| Steam | -------- | 19 | -------- | 19 | -------- | -------- | -------- |
| Net tonnage | -------- | 514 | -------- | 514 | -------- | -------- | -------- |
| Motor | 18 | 153 | 15 | 168 | -------- | -------- | -------- |
| Net tonnage | 251 | 1,850 | 135 | 1,985 | -------- | -------- | -------- |
| Total vessels | 18 | 172 | 15 | 187 | -------- | -------- | -------- |
| Total net tonnage | 251 | 2,364 | 135 | 2,499 | -------- | -------- | -------- |
| Boats: | | | | | | | |
| Motor | 4 | 236 | 61 | 297 | 64 | 79 | 143 |
| Other | 1 | 210 | 47 | 257 | 327 | 6 | 333 |
| Accessory boats | -------- | 1 | 1 | 2 | -------- | -------- | -------- |
| Apparatus: | | | | | | | |
| Haul seines | -------- | 48 | -------- | 48 | -------- | -------- | -------- |
| Length, yards | -------- | 13,066 | -------- | 13,066 | -------- | -------- | -------- |
| Gill nets: | | | | | | | |
| "Shoal", 2¼ to 3⅞ inches | 2,034 | 13,785 | 1,108 | 14,893 | 3,366 | -------- | 3,366 |
| Square yards | 488,920 | 2,879,805 | 370,750 | 3,250,555 | 938,480 | -------- | 938,480 |
| "Shoal", 4 to 6 inches | 1,014 | 10,903 | 1,735 | 12,638 | 1,440 | 244 | 1,684 |
| Square yards | 260,860 | 2,993,985 | 421,115 | 3,415,100 | 576,000 | 77,940 | 653,940 |
| Trammel nets | -------- | 7 | -------- | 7 | -------- | -------- | -------- |
| Square yards | -------- | 660 | -------- | 660 | -------- | -------- | -------- |
| Lines: | | | | | | | |
| Trot | -------- | 478 | 93 | 571 | 363 | -------- | 363 |
| Hooks | -------- | 159,000 | 28,205 | 187,205 | 14,520 | -------- | 14,520 |
| Pound nets | -------- | 293 | 61 | 354 | -------- | 70 | 70 |
| Fyke nets | -------- | 1,373 | 10 | 1,383 | -------- | 93 | 93 |
| Crawfish nets | -------- | 2,710 | -------- | 2,710 | -------- | -------- | -------- |
| Crowfoot bars | -------- | 38 | -------- | 38 | -------- | -------- | -------- |

OPERATING UNITS OF LAKE ONTARIO:[1] BY GEAR

| Item | Haul seines | Gill nets | | Trot lines | Trap nets | Fyke nets | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|
| | | "Shoal", 2¼ to 3⅞ inches | "Shoal", 4 to 6 inches | | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | -------- | 11 | -------- | -------- | -------- | -------- | 11 |
| On boats and shore: | | | | | | | |
| Regular | -------- | 33 | 29 | 2 | 70 | 14 | 111 |
| Casual | 6 | 15 | 11 | 52 | 8 | 1 | 83 |
| Total | 6 | 59 | 40 | 54 | 78 | 15 | 205 |
| Vessels: | | | | | | | |
| Motor | -------- | 3 | -------- | -------- | -------- | -------- | 3 |
| Net tonnage | -------- | 42 | -------- | -------- | -------- | -------- | 42 |
| Boats: | | | | | | | |
| Motor | -------- | 26 | 22 | 8 | 30 | 6 | 67 |
| Other | 3 | 5 | 2 | 46 | 5 | 4 | 61 |
| Apparatus: | | | | | | | |
| Number | 3 | 1,962 | 379 | 63 | 192 | 113 | 2,712 |
| Length, yards | 260 | -------- | -------- | -------- | -------- | -------- | -------- |
| Square yards | -------- | 242,650 | 73,050 | -------- | -------- | -------- | -------- |
| Hooks | -------- | -------- | -------- | 32,010 | -------- | -------- | -------- |

[1] Includes Niagara River below the Falls and the St. Lawrence River.

*Lake fisheries of the United States, 1934*—Continued

OPERATING UNITS OF LAKE ERIE:[1] BY GEAR

| Item | Haul seines | Gill nets | | Trammel nets | Trot lines | Pound nets |
|---|---|---|---|---|---|---|
| | | "Shoal", 2¼ to 3⅞ inches | "Shoal", 4 to 6 inches | | | |
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | 267 | 187 | | | |
| On boats and shore: | | | | | | |
| Regular | 162 | 55 | 17 | 10 | 3 | 22 |
| Casual | 194 | 47 | 7 | 9 | 28 | |
| Total | 356 | 369 | 211 | 19 | 31 | 22 |
| Vessels: | | | | | | |
| Steam | | 21 | 19 | | | |
| Net tonnage | | 585 | 528 | | | |
| Motor | | 32 | 18 | | | |
| Net tonnage | | 279 | 140 | | | |
| Total vessels | | 53 | 37 | | | |
| Total net tonnage | | 864 | 668 | | | |
| Boats: | | | | | | |
| Motor | 26 | 33 | 10 | 8 | 7 | 5 |
| Other | 134 | 19 | 1 | 2 | 24 | 4 |
| Apparatus: | | | | | | |
| Number | 130 | 14,275 | 6,661 | 116 | 39 | 34 |
| Length, yards | 56,531 | | | | | |
| Square yards | | 1,871,367 | 1,606,510 | 4,640 | | |
| Hooks | | | | | 5,750 | |

| Item | Trap nets | Fyke nets | Crowfoot bars | Picks | By hand | Total, exclusive of duplication |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| On vessels | | | | | | 275 |
| On boats and shore: | | | | | | |
| Regular | 477 | 105 | | | | 731 |
| Casual | 37 | 19 | 2 | 3 | 174 | 498 |
| Total | 514 | 124 | 2 | 3 | 174 | 1,504 |
| Vessels: | | | | | | |
| Steam | | | | | | 22 |
| Net tonnage | | | | | | 602 |
| Motor | | | | | | 33 |
| Net tonnage | | | | | | 285 |
| Total vessels | | | | | | 55 |
| Total net tonnage | | | | | | 887 |
| Boats: | | | | | | |
| Motor | 177 | 35 | 1 | | | 276 |
| Other | 11 | 25 | 1 | 2 | 8 | 210 |
| Apparatus, number | 3,986 | 802 | 4 | 3 | | |

[1] Includes Niagara River above the Falls.

*Lake fisheries of the United States, 1934*—Continued

OPERATING UNITS OF LAKE HURON: BY GEAR

| Item | Haul seines | Gill nets | | Trot lines | Pound nets | Trap nets | Fyke nets | Crow-foot bars | Picks | By hand | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | "Shoal", 2¼ to 3⅞ inches | "Shoal", 4 to 6 inches | | | | | | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | | | |
| On vessels | ------ | 58 | 134 | 88 | 14 | 57 | ------ | ------ | ------ | ------ | 248 |
| On boats and shore: | | | | | | | | | | | |
| Regular | 107 | 58 | 113 | 56 | 157 | 626 | 59 | ------ | ------ | ------ | 887 |
| Casual | 85 | 24 | 16 | 7 | 4 | 8 | 6 | 5 | 7 | 15 | 158 |
| Total | 192 | 140 | 263 | 151 | 175 | 691 | 65 | 5 | 7 | 15 | 1,293 |
| Vessels: | | | | | | | | | | | |
| Steam | ------ | 3 | 6 | 4 | 1 | ------ | ------ | ------ | ------ | ------ | 9 |
| Net tonnage | ------ | 30 | 65 | 71 | 5 | ------ | ------ | ------ | ------ | ------ | 125 |
| Motor | ------ | 10 | 28 | 14 | 3 | 17 | ------ | ------ | ------ | ------ | 52 |
| Net tonnage | ------ | 142 | 368 | 263 | 22 | 127 | ------ | ------ | ------ | ------ | 640 |
| Total vessels | ------ | 13 | 34 | 18 | 4 | 17 | ------ | ------ | ------ | ------ | 61 |
| Total net tonnage | ------ | 172 | 433 | 334 | 27 | 127 | ------ | ------ | ------ | ------ | 765 |
| Boats: | | | | | | | | | | | |
| Motor | 37 | 31 | 51 | 18 | 51 | 187 | 18 | 1 | ------ | ------ | 299 |
| Other | 31 | 14 | 9 | 7 | 10 | 50 | 16 | 4 | 7 | 9 | 125 |
| Accessory boats | ------ | ------ | ------ | ------ | 3 | ------ | ------ | ------ | ------ | ------ | 3 |
| Apparatus: | | | | | | | | | | | |
| Number | 63 | 2,115 | 5,823 | 361 | 394 | 2,778 | 339 | 5 | 7 | ------ | ------ |
| Length, yards | 27,258 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Square yards | ------ | 576,860 | 1,606,150 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | ------ |
| Hooks | ------ | ------ | ------ | 135,600 | ------ | ------ | ------ | ------ | ------ | ------ | ------ |

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR

| Item | Haul seines | Gill nets | | Trammel nets | Trot lines lines | Pound nets |
|---|---|---|---|---|---|---|
| | | "Shoal", 2¼ to 3⅞ inches | "Shoal", 4 to 6 inches | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | |
| On vessels | 2 | 611 | 715 | ------ | 215 | 136 |
| On boats and shore: | | | | | | |
| Regular | 79 | 267 | 377 | 2 | 38 | 438 |
| Casual | 43 | 300 | 337 | 8 | 32 | 53 |
| Total | 124 | 1,178 | 1,429 | 10 | 285 | 627 |
| Vessels: | | | | | | |
| Steam | ------ | 24 | 31 | ------ | 13 | 1 |
| Net tonnage | ------ | 515 | 628 | ------ | 369 | 9 |
| Motor | 1 | 169 | 188 | ------ | 55 | 50 |
| Net tonnage | 7 | 2,047 | 2,192 | ------ | 672 | 366 |
| Total vessels | 1 | 193 | 219 | ------ | 68 | 51 |
| Total net tonnage | 7 | 2,562 | 2,820 | ------ | 1,041 | 375 |
| Boats: | | | | | | |
| Motor | 14 | 182 | 160 | ------ | 34 | 168 |
| Other | 42 | 111 | 55 | 7 | 12 | 26 |
| Accessory boats | 1 | ------ | ------ | ------ | ------ | 10 |
| Apparatus: | | | | | | |
| Number | 48 | 22,198 | 29,930 | 7 | 643 | 735 |
| Length, yards | 13,066 | ------ | ------ | ------ | ------ | ------ |
| Square yards | ------ | 4,711,827 | 8,030,696 | 660 | ------ | ------ |
| Hooks | ------ | ------ | ------ | ------ | 291,610 | ------ |

*Lake fisheries of the United States, 1934*—Continued

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR—Continued

| Item | Trap nets | Fyke nets | Crawfish pots | Crowfoot bars | Picks | Diving outfits | By hand | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | |
| On vessels | 58 | 50 | 2 | | | | | 1,038 |
| On boats and shore: | | | | | | | | |
| Regular | 229 | 185 | 6 | | | | | 968 |
| Casual | 7 | 46 | 28 | 449 | 132 | 32 | 119 | 1,266 |
| Total | 294 | 281 | 36 | 449 | 132 | 32 | 119 | 3,272 |
| Vessels: | | | | | | | | |
| Steam | | | | | | | | 39 |
| Net tonnage | | | | | | | | 874 |
| Motor | 18 | 23 | 1 | | | | | 291 |
| Net tonnage | 131 | 182 | 5 | | | | | 3,313 |
| Total vessels | 18 | 23 | 1 | | | | | 330 |
| Total net tonnage | 131 | 182 | 5 | | | | | 4,187 |
| Boats: | | | | | | | | |
| Motor | 80 | 76 | 4 | 241 | | 11 | | 704 |
| Other | 19 | 46 | 24 | 129 | 87 | 21 | 47 | 527 |
| Accessory boats | 4 | | | | | | | 12 |
| Apparatus, number | 601 | 1,429 | 2,710 | 676 | 132 | 16 | | |

OPERATING UNITS OF LAKE SUPERIOR: BY GEAR

| Item | Haul seines | Gill nets | | Lines | | Pound nets | Trap nets | Fyke nets | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|---|
| | | "Shoal", 2¼ to 3⅞ inches | "Shoal", 4 to 6 inches | Troll | Trot | | | | |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Fishermen: | | | | | | | | | |
| On vessels | | 70 | 110 | | 65 | 10 | 3 | 7 | 131 |
| On boats and shore: | | | | | | | | | |
| Regular | 10 | 469 | 422 | 8 | 247 | 79 | 59 | 14 | 729 |
| Casual | 12 | 226 | 177 | 5 | 36 | 6 | 3 | 2 | 342 |
| Total | 22 | 765 | 709 | 13 | 348 | 95 | 65 | 23 | 1,202 |
| Vessels: | | | | | | | | | |
| Steam | | 2 | 7 | | 4 | | | | 6 |
| Net tonnage | | 30 | 129 | | 75 | | | | 115 |
| Motor | | 22 | 26 | | 18 | 4 | 1 | 3 | 35 |
| Net tonnage | | 199 | 235 | | 179 | 30 | 9 | 21 | 301 |
| Total vessels | | 24 | 33 | | 22 | 4 | 1 | 3 | 41 |
| Total net tonnage | | 229 | 364 | | 254 | 30 | 9 | 21 | 416 |
| Boats: | | | | | | | | | |
| Motor | 2 | 169 | 200 | 7 | 115 | 34 | 23 | 7 | 295 |
| Other | 8 | 346 | 173 | | 31 | 13 | | 5 | 421 |
| Accessory boats | | | | | | 2 | 1 | | 3 |
| Apparatus: | | | | | | | | | |
| Number | 10 | 6,504 | 7,921 | 31 | 1,203 | 110 | 108 | 45 | |
| Length, yards | 1,233 | | | | | | | | |
| Square yards | | 1,628,075 | 2,299,188 | | | | | | |
| Hooks | | | | 31 | 261,985 | | | | |

*Lake fisheries of the United States, 1934*—Continued

OPERATING UNITS OF LAKE OF THE WOODS, RAINY LAKE, AND NAMAKAN LAKE: BY GEAR

| Item | Gill nets, "Shoal", 4 to 6 inches | Pound nets | Fyke nets | Total, exclusive of duplication |
|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* |
| On boats and shore, regular | 63 | 36 | 26 | 103 |
| Boats: | | | | |
| Motor | 62 | 17 | 20 | 79 |
| Other | | 6 | | 6 |
| Apparatus: | | | | |
| Number | 244 | 70 | 93 | |
| Square yards | 77,940 | | | |

CATCH: BY GEAR

| Species | New York | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Haul seines | | Gill nets | | Trot lines | | Trap nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | 606,500 | $37,900 | | | 5,600 | $385 |
| Bowfin | | | | | | | 500 | 5 |
| Burbot | | | 10,200 | 229 | | | 200 | 5 |
| Carp | 19,100 | $924 | 5,300 | 135 | | | 10,500 | 130 |
| Catfish and bullheads | 1,200 | 90 | 2,800 | 222 | | | 58,500 | 4,656 |
| Cisco | | | 10,100 | 1,000 | | | | |
| Eels | | | | | 2,500 | $100 | 56,100 | 1,680 |
| Lake herring | | | 115,700 | 10,400 | | | 10,600 | 960 |
| Lake trout | | | 5,100 | 660 | | | 8,600 | 1,100 |
| Mooneye | | | 200 | 3 | | | | |
| Pike or pickerel (jacks) | | | 500 | 35 | | | 13,100 | 920 |
| Rock bass | | | 600 | 28 | | | 5,500 | 116 |
| Sturgeon | | | 2,800 | 810 | 20,300 | 5,640 | 400 | 39 |
| Sucker "mullet" | 25,800 | 1,360 | 21,500 | 600 | | | 35,300 | 815 |
| Sunfish | | | | | | | 17,200 | 350 |
| White bass | | | 2,300 | 75 | | | 100 | 3 |
| Whitefish, common | | | 44,900 | 6,080 | | | 73,300 | 8,800 |
| Yellow perch | | | 143,400 | 6,040 | | | 24,000 | 1,372 |
| Yellow pike | | | 2,900 | 280 | | | 35,500 | 3,362 |
| Total | 46,100 | 2,374 | 974,800 | 64,497 | 22,800 | 5,740 | 355,000 | 24,698 |

| Species | New York—Continued | | | | Pennsylvania | | | |
|---|---|---|---|---|---|---|---|---|
| | Fyke nets | | Total | | Gill nets | | Pound nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | 612,100 | $38,285 | 1,856,300 | $88,180 | 72,600 | $2,900 |
| Bowfin | | | 500 | 5 | | | | |
| Burbot | | | 10,400 | 234 | | | | |
| Carp | 200 | $2 | 35,100 | 1,191 | | | 1,800 | 54 |
| Catfish and bullheads | 12,100 | 950 | 74,600 | 5,918 | | | 2,700 | 135 |
| Cisco | | | 10,100 | 1,000 | 59,000 | 5,900 | 11,000 | 1,100 |
| Eels | 6,300 | 190 | 64,900 | 1,970 | | | | |
| Lake herring | | | 126,300 | 11,360 | | | | |
| Lake trout | | | 13,700 | 1,760 | 200 | 20 | 100 | 10 |
| Mooneye | | | 200 | 3 | | | | |
| Pike or pickerel (jacks) | 1,300 | 90 | 14,900 | 1,045 | | | | |
| Rock bass | | | 6,100 | 144 | | | | |
| Sheepshead | | | | | | | 9,000 | 180 |
| Sturgeon | | | 23,500 | 6,489 | | | 1,000 | 330 |
| Sucker "mullet" | 9,300 | 190 | 91,900 | 2,965 | | | 13,700 | 290 |
| Sunfish | 700 | 14 | 17,900 | 364 | | | | |
| White bass | | | 2,400 | 78 | | | 53,700 | 2,150 |
| Whitefish: | | | | | | | | |
| Common | | | 118,200 | 14,880 | 427,100 | 59,750 | 33,300 | 4,340 |
| Menominee | 200 | 12 | 200 | 12 | | | | |
| Yellow perch | 2,700 | 165 | 170,100 | 7,577 | 546,000 | 20,500 | 163,400 | 6,530 |
| Yellow pike | | | 38,400 | 3,642 | | | 10,200 | 1,020 |
| Total | 32,800 | 1,613 | 1,431,500 | 98,922 | 2,888,600 | 174,350 | 372,500 | 19,039 |

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Pennsylvania—Continued | | | | Ohio | | | |
|---|---|---|---|---|---|---|---|---|
| | Trap nets | | Total | | Haul seines | | Gill nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | 202, 700 | $10, 135 | 2, 131, 600 | $101, 215 | 900 | $46 | 153, 300 | $8, 127 |
| Bowfin | | | | | 5, 400 | 108 | | |
| Burbot | 200 | 4 | 200 | 4 | | | 7, 900 | 191 |
| Carp | 100 | 3 | 1, 900 | 57 | 724, 900 | 13, 773 | 1, 800 | 35 |
| Catfish and bullheads | 1, 000 | 62 | 3, 700 | 197 | 137, 500 | 8, 623 | 500 | 31 |
| Cisco | | | 70, 000 | 7, 000 | | | 23, 000 | 921 |
| Eels | 400 | 8 | 400 | 8 | | | | |
| Goldfish | | | | | 49, 100 | 368 | | |
| Lake trout | | | 300 | 30 | | | | |
| Mooneye | | | | | 18, 300 | 183 | | |
| Sauger | | | | | 8, 800 | 387 | 228, 800 | 10, 067 |
| Sheepshead | 1, 500 | 30 | 10, 500 | 210 | 427, 500 | 7, 267 | 6, 000 | 102 |
| Sturgeon | | | 1, 000 | 330 | | | 10, 100 | 2, 024 |
| Sucker "mullet" | 10, 000 | 300 | 23, 700 | 590 | 27, 900 | 559 | 14, 600 | 292 |
| White bass | 2, 000 | 80 | 55, 700 | 2, 230 | 22, 500 | 809 | 7, 900 | 283 |
| Whitefish, common | 2, 500 | 350 | 462, 900 | 64, 440 | | | 34, 700 | 4, 551 |
| Yellow perch | 88, 900 | 3, 550 | 798, 300 | 30, 580 | 2, 200 | 90 | 5, 062, 900 | 207, 578 |
| Yellow pike | 1, 900 | 190 | 12, 100 | 1, 210 | 6, 700 | 512 | 9, 100 | 694 |
| Total | 311, 200 | 14, 712 | 3, 572, 300 | 208, 101 | 1, 431, 700 | 32, 725 | 5, 560, 600 | 234, 896 |

| Species | Ohio—Continued | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Trammel nets | | Pound nets | | Trap nets | | Fyke nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | | | 5, 606, 000 | $297, 118 | 4, 900 | $257 |
| Burbot | | | | | 239, 700 | 5, 754 | | |
| Carp | 198, 400 | $3, 770 | 4, 000 | $76 | 101, 400 | 1, 926 | 31, 300 | 595 |
| Catfish and bullheads | 500 | 33 | 1, 100 | 43 | 319, 100 | 19, 802 | 38, 500 | 2, 154 |
| Cisco | | | | | 7, 100 | 283 | | |
| Goldfish | 700 | 5 | | | 9, 200 | 69 | 1, 100 | 8 |
| Mooneye | | | 3, 400 | 34 | 2, 000 | 20 | 700 | 7 |
| Sauger | | | | | 488, 400 | 21, 491 | 11, 900 | 522 |
| Sheepshead | 900 | 15 | | | 1, 625, 500 | 27, 634 | 97, 800 | 1, 663 |
| Sturgeon | | | | | 300 | 57 | | |
| Sucker "mullet" | | | 9, 200 | 184 | 737, 200 | 14, 744 | 64, 400 | 1, 287 |
| White bass | 100 | 4 | 1, 800 | 63 | 495, 600 | 17, 840 | 88, 500 | 3, 186 |
| Whitefish, common | | | | | 242, 300 | 31, 740 | 1, 900 | 255 |
| Yellow perch | | | | | 8, 150, 500 | 333, 456 | 36, 900 | 1, 514 |
| Yellow pike | | | 500 | 38 | 1, 089, 500 | 82, 803 | 61, 400 | 4, 666 |
| Total | 200, 600 | 3, 827 | 20, 000 | 438 | 19, 113, 800 | 854, 737 | 439, 300 | 16, 114 |

| Species | Ohio—Continued | | | | Michigan | | | |
|---|---|---|---|---|---|---|---|---|
| | By hand | | Total | | Haul seines | | Gill nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | 5, 765, 100 | $305, 548 | | | | |
| Bowfin | | | 5, 460 | 108 | 100 | $1 | | |
| Burbot | | | 247, 600 | 5, 945 | 100 | 2 | 5, 800 | $110 |
| Carp | | | 1, 061, 800 | 20, 175 | 1, 166, 700 | 22, 995 | 5, 100 | 94 |
| Catfish and bullheads | | | 497, 200 | 30, 686 | 15, 100 | 765 | 100 | 5 |
| Chubs | | | | | 100 | 9 | 1, 553, 100 | 149, 530 |
| Cisco | | | 30, 100 | 1, 204 | | | | |
| Goldfish | | | 60, 100 | 450 | 900 | 7 | | |
| Lake herring | | | | | 26, 000 | 390 | 2, 626, 000 | 47, 950 |
| Lake trout | | | | | | | 3, 950, 900 | 493, 090 |
| Mooneye | | | 24, 400 | 244 | | | | |
| Pike or pickerel (jacks) | | | | | 600 | 38 | 2, 900 | 233 |
| Rock bass | | | | | 1, 300 | 64 | 200 | 16 |
| Sauger | | | 737, 900 | 32, 467 | 1, 000 | 74 | 17, 700 | 2, 016 |
| Sheepshead | | | 2, 157, 700 | 36, 681 | 5, 800 | 99 | 200 | 4 |
| Smelt | | | | | | | 10, 400 | 520 |
| Sturgeon | | | 10, 400 | 2, 081 | | | | |
| Sucker "mullet" | | | 853, 300 | 17, 066 | 151, 100 | 3, 748 | 277, 800 | 5, 743 |
| White bass | | | 616, 400 | 22, 185 | 200 | 5 | 100 | 4 |
| Whitefish: | | | | | | | | |
| Common | | | 278, 900 | 36, 546 | | | 1, 358, 300 | 169, 800 |
| Menominee | | | | | | | 150, 700 | 8, 045 |
| Yellow perch | | | 13, 252, 500 | 542, 638 | 11, 300 | 734 | 218, 700 | 16, 753 |
| Yellow pike | | | 1, 167, 200 | 88, 713 | 77, 800 | 9, 287 | 127, 400 | 15, 248 |
| Mussel shells | 904, 000 | $13, 560 | 904, 000 | 13, 560 | | | | |
| Pearls and slugs | | 457 | | 457 | | | | |
| Total | 904, 000 | 14, 017 | 27, 670, 000 | 1, 156, 754 | 1, 458, 100 | 38, 218 | 10, 305, 400 | 909, 161 |

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Michigan—Continued | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Lines | | | | Pound nets | | Trap nets | |
| | Troll | | Trot | | | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | | | 2,700 | $44 | 100 | $2 | 2,800 | $61 |
| Carp | | | | | 28,700 | 514 | 181,400 | 3,558 |
| Catfish and bullheads | | | 200 | 10 | 2,700 | 135 | 53,400 | 2,684 |
| Chubs | | | | | 7,000 | 629 | 600 | 54 |
| Cisco | | | | | | | 800 | 34 |
| Goldfish | | | | | | | 1,200 | 9 |
| Lake herring | | | | | 3,660,300 | 77,810 | 1,179,900 | 23,950 |
| Lake trout | 5,800 | $650 | 1,567,600 | 180,445 | 519,100 | 62,845 | 266,800 | 31,147 |
| Mooneye | | | | | 300 | 6 | 300 | 3 |
| Pike or pickerel (jacks) | | | | | 2,600 | 210 | 12,400 | 994 |
| Rock bass | | | | | 400 | 32 | 7,800 | 566 |
| Sauger | | | | | 4,800 | 560 | 113,800 | 10,515 |
| Sheepshead | | | | | 9,900 | 297 | 31,700 | 582 |
| Smelt | | | | | 2,200 | 110 | 3,000 | 150 |
| Sucker "mullet" | | | | | 198,800 | 4,130 | 2,770,400 | 66,383 |
| White bass | | | | | | | 7,400 | 266 |
| Whitefish: | | | | | | | | |
| Common | | | 900 | 116 | 943,700 | 122,240 | 2,581,200 | 335,036 |
| Menominee | | | | | 10,100 | 561 | 5,600 | 315 |
| Yellow perch | | | 19,400 | 1,268 | 32,000 | 2,246 | 500,400 | 33,483 |
| Yellow pike | | | 700 | 84 | 278,300 | 33,374 | 1,185,700 | 142,399 |
| Total | 5,800 | 650 | 1,591,500 | 181,967 | 5,701,000 | 305,701 | 8,906,600 | 652,189 |

| Species | Michigan—Continued | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Fyke nets | | Crowfoot bars | | Picks | | Diving outfits | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 3,000 | $30 | | | | | | |
| Burbot | 2,300 | 31 | | | | | | |
| Carp | 43,600 | 833 | | | | | | |
| Catfish and bullheads | 47,300 | 2,407 | | | | | | |
| Chubs | 300 | 27 | | | | | | |
| Goldfish | 5,600 | 42 | | | | | | |
| Lake herring | 10,200 | 234 | | | | | | |
| Lake trout | 2,700 | 300 | | | | | | |
| Pike or pickerel (jacks) | 5,900 | 476 | | | | | | |
| Rock bass | 7,400 | 552 | | | | | | |
| Sauger | 16,700 | 754 | | | | | | |
| Sheepshead | 16,000 | 274 | | | | | | |
| Sucker "mullet" | 266,500 | 5,355 | | | | | | |
| White bass | 5,700 | 207 | | | | | | |
| Whitefish: | | | | | | | | |
| Common | 6,700 | 1,053 | | | | | | |
| Menominee | 100 | 6 | | | | | | |
| Yellow perch | 77,400 | 4,465 | | | | | | |
| Yellow pike | 162,800 | 17,323 | | | | | | |
| Mussel shells | | | 1,237,800 | $23,260 | 251,300 | $4,550 | 35,200 | $667 |
| Pearls and slugs | | | | 895 | | 173 | | 12 |
| Total | 680,200 | 34,369 | 1,237,800 | 24,155 | 251,300 | 4,723 | 35,200 | 679 |

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Michigan—Continued | | | | Indiana | | | |
|---|---|---|---|---|---|---|---|---|
| | By hand | | Total | | Gill nets | | Pound nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | | | 3,100 | $31 | | | | |
| Buffalofish | | | | | | | 1,000 | $45 |
| Burbot | | | 13,800 | 250 | | | | |
| Carp | | | 1,425,500 | 27,994 | | | 2,400 | 72 |
| Catfish and bullheads | | | 118,800 | 6,006 | | | | |
| Chubs | | | 1,561,100 | 150,249 | 352,300 | $33,500 | | |
| Cisco | | | 800 | 34 | | | | |
| Goldfish | | | 7,700 | 58 | | | | |
| Lake herring | | | 7,502,400 | 150,334 | 22,000 | 900 | 28,000 | 800 |
| Lake trout | | | 6,312,900 | 768,477 | 88,400 | 9,300 | | |
| Mooneye | | | 600 | 9 | | | | |
| Pike or pickerel (jacks) | | | 24,400 | 1,951 | | | | |
| Rock bass | | | 17,100 | 1,230 | | | | |
| Sauger | | | 154,000 | 13,919 | | | | |
| Sheepshead | | | 63,600 | 1,256 | | | | |
| Smelt | | | 15,600 | 780 | | | | |
| Steelhead trout | | | | | 1,600 | 250 | | |
| Sucker "mullet" | | | 3,664,600 | 85,359 | | | 600 | 18 |
| White bass | | | 13,400 | 482 | | | | |
| Whitefish: | | | | | | | | |
| Common | | | 4,890,800 | 628,245 | 3,000 | 360 | 900 | 110 |
| Menominee | | | 166,500 | 8,927 | | | | |
| Yellow perch | | | 859,200 | 58,949 | 48,500 | 3,900 | 1,600 | 128 |
| Yellow pike | | | 1,832,700 | 217,715 | | | 1,300 | 140 |
| Mussel shells | 219,800 | $3,777 | 1,744,100 | 32,254 | | | | |
| Pearls and slugs | | 340 | | 1,420 | | | | |
| Total | 219,800 | 4,117 | 30,392,700 | 2,155,929 | 515,800 | 48,210 | 35,800 | 1,313 |

| Species | Indiana—Continued | | | | | | Illinois | |
|---|---|---|---|---|---|---|---|---|
| | Crowfoot bars | | By hand | | Total | | Gill nets | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Buffalofish | | | | | 1,000 | $45 | | |
| Carp | | | | | 2,400 | 72 | | |
| Chubs | | | | | 352,300 | 33,500 | 827,700 | $65,300 |
| Lake herring | | | | | 50,000 | 1,700 | 50,700 | 1,000 |
| Lake trout | | | | | 88,400 | 9,300 | 225,200 | 21,800 |
| Steelhead trout | | | | | 1,600 | 250 | | |
| Sucker "mullet" | | | | | 600 | 18 | | |
| Whitefish, common | | | | | 3,900 | 470 | 700 | 84 |
| Yellow perch | | | | | 50,100 | 4,028 | 102,400 | 3,600 |
| Yellow pike | | | | | 1,300 | 140 | | |
| Mussel shells | 124,000 | $1,860 | 26,000 | $390 | 150,000 | 2,250 | | |
| Total | 124,000 | 1,860 | 26,000 | 390 | 701,600 | 51,773 | 1,206,700 | 91,784 |

| Species | Wisconsin | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Haul seines | | Gill nets | | Trammel nets | | Trot lines | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | | | 21,700 | $217 | | | 5,000 | $50 |
| Carp | 1,223,800 | $15,300 | 12,600 | 157 | 17,900 | $224 | | |
| Catfish and bullheads | 3,200 | 210 | 2,000 | 130 | | | | |
| Chubs | | | 4,354,600 | 389,315 | | | | |
| Lake herring | | | 5,506,000 | 89,131 | | | | |
| Lake trout | | | 2,169,600 | 247,056 | | | 719,700 | 84,653 |
| Pike or pickerel (jacks) | | | 22,600 | 1,786 | | | | |
| Smelt | | | 264,000 | 4,000 | | | | |
| Sucker "mullet" | 13,100 | 460 | 397,100 | 13 737 | | | | |
| Whitefish: | | | | | | | | |
| Common | | | 136,500 | 17,778 | | | | |
| Menominee | | | 40,000 | 2,415 | | | | |
| Yellow perch | | | 245,000 | 13,522 | | | | |
| Yellow pike | | | 2,200 | 221 | | | | |
| Total | 1,240,100 | 15,970 | 13,173,900 | 779,465 | 17,900 | 224 | 724,700 | 84,703 |

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY GEAR—Continued

| Species | Wisconsin—Continued | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Pound nets | | Fyke nets | | Crawfish pots | | Crowfoot bars | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | 1,500 | $15 | 4,000 | $40 | | | | |
| Carp | 1,300 | 16 | 52,900 | 661 | | | | |
| Catfish and bullheads | 700 | 45 | 43,000 | 2,800 | | | | |
| Chubs | 11,700 | 1,040 | 500 | 45 | | | | |
| Lake herring | 2,674,300 | 46,702 | 14,400 | 243 | | | | |
| Lake trout | 312,100 | 36,132 | 100 | 13 | | | | |
| Pike or pickerel (jacks) | 19,000 | 1,502 | 27,500 | 2,193 | | | | |
| Smelt | 603,500 | 9,100 | 146,200 | 2,200 | | | | |
| Sucker "mullet" | 117,200 | 2,804 | 327,800 | 11,055 | | | | |
| Whitefish: | | | | | | | | |
| Common | 199,800 | 25,647 | 500 | 48 | | | | |
| Menominee | 19,600 | 922 | 900 | 54 | | | | |
| Yellow perch | 90,800 | 5,000 | 482,700 | 26,509 | | | | |
| Yellow pike | 10,600 | 1,081 | 9,900 | 998 | | | | |
| Crawfish | | | | | 35,600 | $3,200 | | |
| Mussel shells | | | | | | | 320,000 | $3,110 |
| Total | 4,062,100 | 130,006 | 1,110,400 | 46,859 | 35,600 | 3,200 | 320,000 | 3,110 |

| Species | Wisconsin—Continued | | | | Minnesota | | | |
|---|---|---|---|---|---|---|---|---|
| | By hand | | Total | | Gill nets | | Trot lines | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | | | 32,200 | $322 | 13,700 | $36 | | |
| Carp | | | 1,308,500 | 16,358 | 200 | 3 | | |
| Catfish and bullheads | | | 48,900 | 3,185 | 5,600 | 225 | | |
| Chubs | | | 4,366,800 | 390,400 | 40,800 | 4,124 | | |
| Lake herring | | | 8,194,700 | 136,076 | 8,016,600 | 139,729 | | |
| Lake trout | | | 3,201,500 | 367,854 | 219,900 | 25,006 | 49,800 | $5,539 |
| Mooneye | | | | | 500 | 6 | | |
| Pike or pickerel (jacks) | | | 69,100 | 5,481 | 293,500 | 6,340 | | |
| Sauger | | | | | 213,700 | 8,546 | | |
| Smelt | | | 1,013,700 | 15,300 | | | | |
| Sturgeon | | | | | 200 | 46 | | |
| Sucker "mullet" | | | 855,200 | 28,056 | 81,400 | 934 | | |
| Tullibees | | | | | 152,400 | 381 | | |
| Whitefish: | | | | | | | | |
| Common | | | 336,800 | 43,473 | 103,100 | 8,855 | | |
| Menominee | | | 60,500 | 3,391 | 1,800 | 127 | | |
| Yellow perch | | | 818,500 | 45,031 | 36,000 | 1,469 | | |
| Yellow pike | | | 22,700 | 2,300 | 627,700 | 49,265 | | |
| Crawfish | | | 35,600 | 3,200 | | | | |
| Mussel shells | 16,300 | $150 | 336,300 | 3,260 | | | | |
| Total | 16,300 | 150 | 20,701,000 | 1,063,687 | 9,807,100 | 245,092 | 49,800 | 5,539 |

| Species | Minnesota—Continued | | | | | |
|---|---|---|---|---|---|---|
| | Pound nets | | Fyke nets | | Total | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | 77,600 | $194 | | | 91,300 | $230 |
| Carp | 8,300 | 83 | 2,800 | $27 | 11,300 | 113 |
| Catfish and bullheads | 600 | 24 | 39,800 | 1,590 | 46,000 | 1,839 |
| Chubs | 100 | 1 | | | 40,900 | 4,125 |
| Crappie | 300 | 20 | 700 | 53 | 1,000 | 73 |
| Lake herring | | | | | 8,016,600 | 139,729 |
| Lake trout | | | | | 269,700 | 30,545 |
| Mooneye | | | | | 500 | 6 |
| Pike or pickerel (jacks) | 118,400 | 2,558 | 38,500 | 800 | 450,400 | 9,698 |
| Sauger | 61,800 | 2,473 | 7,000 | 280 | 282,500 | 11,299 |
| Sturgeon | 1,400 | 325 | | | 1,600 | 371 |
| Sucker "mullet" | 32,300 | 496 | 13,500 | 223 | 127,200 | 1,653 |
| Tullibees | 3,100 | 8 | | | 155,500 | 389 |
| Whitefish: | | | | | | |
| Common | 77,200 | 6,295 | 3,500 | 280 | 183,800 | 15,430 |
| Menominee | | | | | 1,800 | 127 |
| Yellow perch | 4,300 | 188 | 8,000 | 321 | 48,300 | 1,978 |
| Yellow pike | 325,300 | 25,816 | 54,000 | 4,099 | 1,007,000 | 79,180 |
| Total | 710,700 | 38,481 | 167,800 | 7,673 | 10,735,400 | 296,785 |

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY LAKES

| Species | Lake Ontario | | Lake Erie | | | |
|---|---|---|---|---|---|---|
| | New York | | New York | | Pennsylvania | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | 152,700 | $10,725 | 459,400 | $27,560 | 2,131,600 | $101,215 |
| Bowfin | 500 | 5 | | | | |
| Burbot | 7,500 | 205 | 2,900 | 29 | 200 | 4 |
| Carp | 17,000 | 281 | 18,100 | 910 | 1,900 | 57 |
| Catfish and bullheads | 72,300 | 5,740 | 2,300 | 178 | 3,700 | 197 |
| Cisco | | | 10,100 | 1,000 | 70,000 | 7,000 |
| Eels | 64,900 | 1,970 | | | 400 | 8 |
| Lake herring | 126,300 | 11,360 | | | | |
| Lake trout | 13,600 | 1,750 | 100 | 10 | 300 | 30 |
| Mooneye | | | 200 | 3 | | |
| Pike or pickerel (jacks) | 14,900 | 1,045 | | | | |
| Rock bass | 5,600 | 114 | 500 | 30 | | |
| Sheepshead | | | | | 10,500 | 210 |
| Sturgeon | 16,400 | 4,500 | 7,100 | 1,989 | 1,000 | 330 |
| Sucker "mullet" | 47,300 | 955 | 44,600 | 2,010 | 23,700 | 590 |
| Sunfish | 17,900 | 364 | | | | |
| White bass | | | 2,400 | 78 | 55,700 | 2,230 |
| Whitefish: | | | | | | |
| Common | 83,600 | 10,040 | 34,600 | 4,840 | 462,900 | 64,440 |
| Menominee | 200 | 12 | | | | |
| Yellow perch | 51,400 | 3,105 | 118,700 | 4,472 | 798,300 | 30,580 |
| Yellow pike | 24,500 | 2,680 | 13,900 | 962 | 12,100 | 1,210 |
| Total | 716,600 | 54,851 | 714,900 | 44,071 | 3,572,300 | 208,101 |

| Species | Lake Erie—Continued | | | | | |
|---|---|---|---|---|---|---|
| | Ohio | | Michigan | | Total | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | 5,765,100 | $305,548 | | | 8,356,100 | $434,323 |
| Bowfin | 5,400 | 108 | | | 5,400 | 108 |
| Burbot | 247,600 | 5,945 | 2,100 | $50 | 252,800 | 6,028 |
| Carp | 1,661,800 | 20,175 | 398,700 | 7,574 | 1,480,500 | 28,716 |
| Catfish and bullheads | 497,200 | 30,686 | 64,400 | 3,283 | 567,600 | 34,344 |
| Cisco | 30,100 | 1,204 | 800 | 34 | 111,000 | 9,238 |
| Eels | | | | | 400 | 8 |
| Goldfish | 60,100 | 450 | 7,700 | 58 | 67,800 | 508 |
| Lake trout | | | 800 | 87 | 1,200 | 127 |
| Mooneye | 24,400 | 244 | 300 | 3 | 24,900 | 250 |
| Pike or pickerel (jacks) | | | 500 | 20 | 500 | 20 |
| Rock bass | | | 2,700 | 82 | 3,200 | 112 |
| Sauger | 737,900 | 32,467 | 47,400 | 2,080 | 785,300 | 34,547 |
| Sheepshead | 2,157,700 | 36,681 | 50,000 | 848 | 2,218,200 | 37,739 |
| Sturgeon | 10,400 | 2,081 | | | 18,500 | 4,400 |
| Sucker "mullet" | 853,300 | 17,066 | 95,100 | 1,899 | 1,016,700 | 21,565 |
| White bass | 616,400 | 22,185 | 13,200 | 474 | 687,700 | 24,967 |
| Whitefish, common | 278,900 | 36,546 | 1,000 | 136 | 777,400 | 105,962 |
| Yellow perch | 13,252,500 | 542,638 | 49,900 | 2,146 | 14,219,400 | 579,836 |
| Yellow pike | 1,167,200 | 88,713 | 52,700 | 3,999 | 1,245,900 | 94,884 |
| Mussel shells [1] | 904,000 | 13,560 | 64,700 | 1,120 | 968,700 | 14,680 |
| Pearls and slugs [1] | | 457 | | 419 | | 906 |
| Total | 27,670,000 | 1,156,754 | 852,000 | 24,342 | 32,809,200 | 1,433,268 |

[1] From tributary streams.

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY LAKES—Continued

| Species | Lake Huron | | Lake Michigan | | | |
|---|---|---|---|---|---|---|
| | Michigan | | Michigan | | Indiana | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 3, 100 | $31 | | | | |
| Buffalofish | | | | | 1, 000 | $45 |
| Burbot | 2, 100 | 21 | 7, 800 | $161 | | |
| Carp | 1, 015, 200 | 20, 304 | 10, 200 | 102 | 2, 400 | 72 |
| Catfish and bullheads | 50, 800 | 2, 540 | 3, 300 | 165 | | |
| Chubs | 413, 700 | 37, 232 | 973, 900 | 97, 390 | 352, 300 | 33, 500 |
| Lake herring | 4, 371, 300 | 87, 434 | 1, 063, 400 | 31, 880 | 50, 000 | 1, 700 |
| Lake trout | 1, 521, 500 | 174, 990 | 2, 365, 100 | 295, 640 | 88, 400 | 9, 300 |
| Mooneye | 300 | 6 | | | | |
| Pike or pickerel (jacks) | 7, 500 | 604 | 14, 500 | 1, 175 | | |
| Rock bass | 12, 800 | 1, 020 | 1, 400 | 112 | | |
| Sauger | 73, 200 | 8, 056 | 31, 300 | 3, 552 | | |
| Sheepshead | 4, 300 | 129 | 9, 300 | 279 | | |
| Smelt | | | 15, 600 | 780 | | |
| Steelhead trout | | | | | 1, 600 | 250 |
| Sucker "mullet" | 2, 198, 100 | 57, 160 | 1, 276, 500 | 24, 400 | 600 | 18 |
| White bass | 100 | 4 | 100 | 4 | | |
| Whitefish: | | | | | | |
| Common | 2, 565, 800 | 333, 513 | 1, 931, 200 | 231, 744 | 3, 900 | 470 |
| Menominee | 52, 600 | 3, 155 | 105, 400 | 5, 270 | | |
| Yellow perch | 519, 400 | 33, 600 | 285, 800 | 22, 878 | 50, 100 | 4, 028 |
| Yellow pike | 1, 615, 400 | 193, 814 | 157, 400 | 18, 800 | 1, 300 | 140 |
| Mussel shells [1] | 84, 400 | 1, 210 | 1, 595, 000 | 29, 924 | 150, 000 | 2, 250 |
| Pearls and slugs [1] | | 40 | | 931 | | |
| Total | 14, 511, 600 | 954, 863 | 9, 847, 200 | 765, 187 | 701, 600 | 51, 773 |

| Species | Lake Michigan—Continued | | | | | |
|---|---|---|---|---|---|---|
| | Illinois | | Wisconsin | | Total | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Buffalofish | | | | | 1, 000 | $45 |
| Burbot | | | 32, 200 | $322 | 40. 000 | 483 |
| Carp | | | 1, 308, 500 | 16, 358 | 1, 321, 100 | 16, 532 |
| Catfish and bullheads | | | 48, 900 | 3, 185 | 52. 200 | 3, 350 |
| Chubs | 827, 700 | $65, 300 | 4, 108, 300 | 369, 725 | 6, 262, 200 | 565, 915 |
| Lake herring | 50, 700 | 1, 000 | 5, 248, 300 | 91, 880 | 6, 412, 400 | 126, 400 |
| Lake trout | 225, 200 | 21, 800 | 2, 590, 400 | 309, 800 | 5, 269, 100 | 636, 540 |
| Pike or pickerel (jacks) | | | 65, 400 | 5, 260 | 79, 900 | 6, 435 |
| Rock bass | | | | | 1, 400 | 112 |
| Sauger | | | | | 31, 300 | 3, 552 |
| Sheepshead | | | | | 9, 300 | 279 |
| Smelt | | | 1, 013, 700 | 15, 300 | 1, 029, 300 | 16, 080 |
| Steelhead trout | | | | | 1, 600 | 250 |
| Sucker "mullet" | | | 785, 700 | 27, 360 | 2, 062, 800 | 51, 778 |
| White bass | | | | | 100 | 4 |
| Whitefish: | | | | | | |
| Common | 700 | 84 | 246, 000 | 34, 400 | 2, 181, 800 | 266, 698 |
| Menominee | | | 47, 500 | 2, 874 | 152, 900 | 8, 144 |
| Yellow perch | 102, 400 | 3, 600 | 817, 900 | 45, 000 | 1, 256, 200 | 75, 506 |
| Yellow pike | | | 4, 000 | 434 | 162, 700 | 19, 374 |
| Crawfish | | | 35, 600 | 3, 200 | 35, 600 | 3, 200 |
| Mussel shells [1] | | | 336, 300 | 3, 260 | 2, 081, 300 | 35, 434 |
| Pearls and slugs [1] | | | | | | 931 |
| Total | 1, 206, 700 | 91, 784 | 16, 688, 700 | 928, 358 | 28, 444, 200 | 1, 837, 102 |

[1] From tributary streams.

*Lake fisheries of the United States, 1934*—Continued

CATCH: BY LAKES—Continued

| Species | Lake Superior | | | | | |
|---|---|---|---|---|---|---|
| | Michigan | | Wisconsin | | Minnesota | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | 1,800 | $18 | | | | |
| Carp | 1,400 | 14 | | | | |
| Catfish and bullheads | 300 | 18 | | | | |
| Chubs | 173,500 | 15,627 | 258,500 | $20,675 | 40,800 | $4,124 |
| Lake herring | 2,067,700 | 31,020 | 2,946,400 | 44,196 | 8,016,600 | 139,729 |
| Lake trout | 2,425,500 | 297,760 | 611,100 | 58,054 | 269,700 | 30,545 |
| Pike or pickerel (jacks) | 1,900 | 152 | 3,700 | 221 | 200 | 12 |
| Rock bass | 200 | 16 | | | | |
| Sauger | 2,100 | 231 | | | | |
| Sucker "mullet" | 94,900 | 1,900 | 69,500 | 696 | 300 | 6 |
| Whitefish: | | | | | | |
| Common | 392,800 | 62,852 | 90,800 | 9,073 | 9,600 | 1,345 |
| Menominee | 8,500 | 502 | 13,000 | 517 | 1,800 | 127 |
| Yellow perch | 4,100 | 325 | 600 | 31 | | |
| Yellow pike | 7,200 | 1,102 | 18,700 | 1,866 | | |
| Total | 5,181,900 | 411,537 | 4,012,300 | 135,329 | 8,339,000 | 175,888 |

| Species | Lake Superior—Total | | Lake of the Woods, Rainy Lake, and Namakan Lake | | Total, all lakes | |
|---|---|---|---|---|---|---|
| | | | Minnesota | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | | | 8,508,800 | $445,048 |
| Bowfin | | | | | 9,000 | 144 |
| Buffalofish | | | | | 1,000 | 45 |
| Burbot | 1,800 | $18 | 91,300 | $230 | 395,500 | 6,985 |
| Carp | 1,400 | 14 | 11,300 | 113 | 3,846,500 | 65,960 |
| Catfish and bullheads | 300 | 18 | 46,000 | 1,839 | 789,200 | 47,831 |
| Chubs | 472,800 | 40,426 | 100 | 1 | 7,148,800 | 643,574 |
| Cisco | | | | | 111,000 | 9,238 |
| Crappie | | | 1,000 | 73 | 1,000 | 73 |
| Eels | | | | | 65,300 | 1,978 |
| Goldfish | | | | | 67,800 | 508 |
| Lake herring | 13,030,700 | 214,945 | | | 23,940,700 | 440,199 |
| Lake trout | 3,306,300 | 386,359 | | | 10,111,700 | 1,199,766 |
| Mooneye | | | 500 | 6 | 25,700 | 262 |
| Pike or pickerel (jacks) | 5,800 | 385 | 450,200 | 9,686 | 558,800 | 18,175 |
| Rock bass | 200 | 16 | | | 23,200 | 1,374 |
| Sauger | 2,100 | 231 | 282,500 | 11,299 | 1,174,400 | 57,685 |
| Sheepshead | | | | | 2,231,800 | 38,147 |
| Smelt | | | | | 1,029,300 | 16,080 |
| Steelhead trout | | | | | 1,600 | 250 |
| Sturgeon | | | 1,600 | 371 | 36,500 | 9,271 |
| Sucker "mullet" | 164,700 | 2,602 | 126,900 | 1,647 | 5,616,500 | 135,707 |
| Sunfish | | | | | 17,900 | 364 |
| Tullibees | | | 155,500 | 389 | 155,500 | 389 |
| White bass | | | | | 687,900 | 24,975 |
| Whitefish: | | | | | | |
| Common | 493,200 | 73,270 | 174,200 | 14,085 | 6,276,000 | 803,568 |
| Menominee | 23,300 | 1,146 | | | 229,000 | 12,457 |
| Yellow perch | 4,700 | 356 | 48,300 | 1,978 | 16,099,400 | 694,381 |
| Yellow pike | 25,900 | 2,968 | 1,007,000 | 79,180 | 4,081,400 | 392,900 |
| Crawfish | | | | | 35,600 | 3,200 |
| Mussel shells [1] | | | | | 3,134,400 | 51,324 |
| Pearls and slugs [1] | | | | | | 1,877 |
| Total | 17,533,200 | 722,754 | 2,396,400 | 120,897 | 96,411,200 | 5,123,735 |

[1] From tributary streams.

MARINE BIOLOGICAL LABORATORY WOODS HOLE LIBRARY

*Industries related to the fisheries of the Lake States, 1934*

OPERATING UNITS, SALARIES, AND WAGES

| Items | New York | Pennsylvania | Ohio | Michigan | Indiana and Illinois | Wisconsin | Minnesota | Total |
|---|---|---|---|---|---|---|---|---|
| Transporting: | | | | | | | | |
| Persons engaged, on vessels | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Vessels, motor | | | 12 | 3 | | | | 15 |
| Net tonnage | | | 7 | 1 | | | | 8 |
| Wholesale and manufacturing: | | | 93 | 21 | | | | 114 |
| Establishments | 15 | 7 | 48 | 58 | 56 | 43 | 11 | 238 |
| Persons engaged: | | | | | | | | |
| Proprietors | 13 | 9 | 45 | 45 | 26 | 29 | 6 | 173 |
| Salaried employees | 26 | 7 | 72 | 81 | 227 | 74 | 34 | 521 |
| Wage earners: | | | | | | | | |
| Average for season | 109 | 73 | 442 | 434 | 458 | 568 | 89 | 2,173 |
| Average for year | 64 | 28 | 239 | 190 | 383 | 201 | 47 | 1,152 |
| Paid to salaried employees | $36,186 | $18,752 | $175,880 | $136,311 | $561,706 | $83,855 | $38,466 | $1,051,156 |
| Paid to wage earners | $74,940 | $31,187 | $302,250 | $196,739 | $535,691 | $201,532 | $49,384 | $1,391,723 |
| Total salaries and wages | $111,126 | $49,939 | $478,130 | $333,050 | $1,097,397 | $285,387 | $87,850 | $2,442,879 |
| Fishermen manufacturing | | | | 72 | | 121 | 342 | 535 |

PRODUCTS MANUFACTURED

| Item | New York | | Pennsylvania | | Ohio | | Michigan | |
|---|---|---|---|---|---|---|---|---|
| By manufacturing establishments: | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Carp, smoked ... pounds | | | | | 4,600 | $950 | (1) | (1) |
| Chubs, smoked ... do | (1) | (1) | | | 115,400 | 21,750 | 500,600 | $132,364 |
| Cisco, smoked ... do | | | | | (1) | (1) | | |
| Lake herring: | | | | | | | | |
| Fresh fillets ... do | | | | | | | (1) | (1) |
| Salted ... do | | | | | | | 1,462,900 | 54,103 |
| Smoked ... do | (1) | (1) | | | | | (1) | (1) |
| Lake trout: | | | | | | | | |
| Fresh fillets ... do | | | (1) | (1) | | | | |
| Smoked ... do | | | | | 3,500 | 1,175 | 62,230 | 13,545 |
| Pike: | | | | | | | | |
| Fresh fillets ... do | 194,326 | $37,721 | 272,256 | $50,721 | 877,288 | 162,443 | | |
| Frozen fillets ... do | (1) | (1) | 91,954 | 17,243 | 287,157 | 50,621 | | |
| Salmon: | | | | | | | | |
| Smoked ... do | (1) | (1) | | | 23,800 | 5,860 | (1) | (1) |
| Sturgeon, smoked ... do | (1) | (1) | | | 12,160 | 8,605 | | |
| Tullibees, smoked ... do | (1) | (1) | | | 249,400 | 43,860 | (1) | (1) |
| White bass, | | | | | | | | |
| Fresh fillets ... do | | | (1) | (1) | 18,173 | 2,571 | | |
| Frozen fillets ... do | | | (1) | (1) | 7,108 | 794 | | |
| Whitefish, smoked ... do | (1) | (1) | | | 57,100 | 11,975 | 50,530 | 10,720 |
| Yellow perch: | | | | | | | | |
| Fresh fillets ... do | 22,670 | 4,770 | 69,611 | 13,210 | 1,148,346 | 200,028 | (1) | (1) |
| Frozen fillets ... do | | | 9,587 | 1,780 | 207,123 | 35,186 | | |
| Unclassified products: | | | | | | | | |
| Fillets, fresh and frozen ... pounds | (2) | (2) | [3] 6,440 | [3] 1,082 | (2) | (2) | [4] 98,725 | [4] 10,063 |
| Smoked ... do | (2) | (2) | | | (2) | (2) | [5] 188,540 | [5] 48,196 |
| Miscellaneous | [9] 237,600 | [9] 51,960 | | | [10] 27,723 | [10] 5,543 | | |
| Total | 454,596 | 94,451 | 449,848 | 84,036 | 3,038,878 | 551,361 | 2,363,525 | 268,991 |
| By fishermen: | | | | | | | | |
| Lake herring, salted ... pounds | | | | | | | 251,300 | 8,795 |
| Lake trout, salted ... do | | | | | | | 25,000 | 1,240 |
| Total ... do | | | | | | | 276,300 | 10,035 |
| Grand total ... do | 454,596 | 94,451 | 449,848 | 84,036 | 3,038,878 | 551,361 | 2,639,825 | 279,026 |

See footnotes at end of table.

*Industries related to the fisheries of the Lake States, 1934*—Continued

PRODUCTS MANUFACTURED—Continued

| Item | Illinois | | Wisconsin | | Minnesota | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing establishments: | | | | | | |
| Alewives: | | | | | | |
| Pickled ... pounds | 202, 500 | $28, 750 | | | (1) | (1) |
| Spiced ... do | | | 383, 500 | $54, 925 | | |
| Carp, smoked ... do | (1) | (1) | | | | |
| Chubs, smoked ... do | 1, 653, 290 | 379, 319 | 901, 297 | 176, 692 | 23, 600 | $4, 160 |
| Cisco, smoked ... do | 17, 545 | 4, 564 | | | | |
| Lake herring: | | | | | | |
| Fresh fillets ... do | | | 136, 610 | 12, 761 | | |
| Salted | | | 2, 393, 180 | 78, 652 | | |
| Smoked ... do | (1) | (1) | 675, 000 | 44, 250 | (1) | (1) |
| Lake trout: | | | | | | |
| Fresh fillets ... do | (1) | (1) | 9, 824 | 2, 141 | | |
| Smoked ... do | 78, 256 | 19, 128 | 177, 120 | 35, 574 | (1) | (1) |
| Pike: | | | | | | |
| Fresh fillets ... do | 680, 850 | 139, 003 | 122, 339 | 28, 003 | | |
| Frozen fillets ... do | (1) | (1) | | | | |
| Salmon: | | | | | | |
| Smoked ... do | 628, 400 | 219, 625 | 77, 977 | 12, 850 | (1) | (1) |
| Kippered ... do | 24, 454 | 7, 850 | | | (1) | (1) |
| Sturgeon, smoked ... do | 3, 157 | 2, 479 | | | | |
| Tullibees, smoked ... do | 91, 444 | 17, 423 | (1) | (1) | (1) | (1) |
| White bass, fresh fillets ... do | (1) | (1) | | | | |
| Whitefish, smoked ... do | (1) | (1) | (1) | (1) | (1) | (1) |
| Yellow perch: | | | | | | |
| Fresh fillets ... do | 1, 243, 739 | 246, 700 | 176, 193 | 38, 306 | | |
| Frozen fillets ... do | (1) | (1) | | | | |
| Unclassified products: | | | | | | |
| Fillets, fresh and frozen ... do | [5] 152, 817 | [5] 30, 691 | (2) | (2) | | |
| Smoked ... do | [7] 30, 886 | [7] 6, 623 | [8] 41, 764 | [8] 6, 702 | (2) | (2) |
| Miscellaneous | | | | [11] 61, 855 | | [12] 38, 170 |
| Total | 4, 807, 338 | 1, 102, 155 | | 552, 711 | | 42, 330 |
| By fishermen: | | | | | | |
| Chubs, smoked ... pounds | | | 26, 000 | 4, 940 | | |
| Lake herring, salted ... do | | | 892, 540 | 31, 425 | 600, 000 | 21, 000 |
| Lake trout, smoked ... do | | | 2, 500 | 450 | | |
| Total ... do | | | 921, 040 | 36, 815 | 600, 000 | 21, 000 |
| Grand total ... do | 4, 807, 338 | 1, 102, 155 | | 589, 526 | | 63, 330 |

[1] This item has been included under "Unclassified products."
[2] The production of this item is included under "Miscellaneous."
[3] Includes fresh fillets of lake trout, sheepshead, white bass and whitefish; and frozen fillets of sheepshead and white bass.
[4] Includes fresh fillets of lake herring and yellow perch; and frozen fillets of lake herring.
[5] Includes fresh fillets of lake trout, white bass and whitefish; and frozen fillets of pike and yellow perch.
[6] Includes smoked carp, lake herring, mackerel, menominee, salmon, and tullibees.
[7] Includes smoked buffalofish, carp, lake herring, sablefish, shad, and whitefish.
[8] Includes smoked carp, tullibees, and whitefish.
[9] Includes frozen fillets of pike; and smoked butterfish, chubs, eels, lake herring, salmon, sturgeon, tullibees, and whitefish.
[10] Includes fresh and frozen fillets of sheepshead; and smoked cisco and sablefish.
[11] Includes fresh fillets of whitefish; spiced chubs and sea herring; Bismarck herring; canned whitefish caviar; burbot liver oil; and mussel-shell products.
[12] Includes smoked lake herring, lake trout, salmon, tullibees, and whitefish; kippered salmon; pickled alewives; and burbot liver oil.

NOTE.—The total value of the manufactured products for the Lake States was as follows: By manufacturing establishments, $2,696,035; and by fishermen, $67,850. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 224 have also been included as fishermen and 6 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

*Lake fisheries of the United States and Canada, 1933*

CATCH: BY LAKES

| Species | Lake Ontario | | | Lake Erie | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Blue pike | 226,800 | 62,000 | 288,800 | 8,786,400 | 4,151,600 | 12,938,000 |
| Bowfin | 700 | (1) | 700 | 400 | (1) | 400 |
| Burbot | 700 | (1) | 700 | 251,800 | (1) | 251,800 |
| Carp | 6,300 | 98,300 | 104,600 | 2,067,300 | 580,700 | 2,648,000 |
| Catfish and bullheads | 68,600 | 192,000 | 260,600 | 996,900 | 100,000 | 1,096,900 |
| Cisco | | | | 135,500 | 177,700 | 313,200 |
| Eels | 40,200 | 65,900 | 106,100 | | | |
| Goldfish | | | | 99,500 | (1) | 99,500 |
| Lake herring | 41,700 | 780,300 | 822,000 | | | |
| Lake trout | 12,400 | 353,200 | 365,600 | 4,500 | 1,500 | 6,000 |
| Mooneye | | | | 5,800 | (1) | 5,800 |
| Pike or pickerel (jacks) | 2,900 | 191,800 | 194,700 | 5,900 | 84,900 | 90,800 |
| Rock bass | 1,400 | (1) | 1,400 | 3,400 | (1) | 3,400 |
| Sauger | | | | 2,218,600 | (1) | 2,218,600 |
| Sheepshead | | | | 3,006,800 | (1) | 3,006,800 |
| Sturgeon | 13,300 | 3,600 | 16,900 | 6,200 | 25,000 | 31,200 |
| Sucker "mullet" | 23,100 | (1) | 23,100 | 1,524,800 | (1) | 1,524,800 |
| Sunfish | 5,600 | (1) | 5,600 | | | |
| White bass | 800 | (1) | 800 | 394,400 | (1) | 394,400 |
| Whitefish, common | 40,400 | 473,600 | 514,000 | 997,200 | 710,000 | 1,707,200 |
| Yellow perch | 34,700 | 109,200 | 143,900 | 3,434,500 | 2,729,000 | 6,163,500 |
| Yellow pike | 7,200 | 24,500 | 31,700 | 1,180,900 | 249,400 | 1,430,300 |
| Mussel shells | | | | 1,066,000 | (1) | 1,066,000 |
| Miscellaneous | | 230,200 | 230,200 | | 1,421,800 | 1,421,800 |
| Total | 526,800 | 2,584,600 | 3,111,400 | 26,186,800 | 10,231,600 | 36,418,400 |

| Species | Lake Huron | | | Lake Michigan | Lake Superior | | |
|---|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Bowfin | 100 | (1) | 100 | | | | |
| Buffalofish | | | | 1,400 | | | |
| Burbot | 2,700 | (1) | 2,700 | 55,500 | 3,600 | (1) | 3,600 |
| Carp | 971,900 | 20,700 | 992,600 | 918,200 | 100 | 2,400 | 2,500 |
| Catfish and bullheads | 62,000 | 3,400 | 65,400 | 46,400 | | | |
| Chubs | 597,700 | 997,700 | 1,595,400 | 4,035,900 | 525,200 | 673,800 | 1,199,000 |
| Lake herring | 2,409,700 | 333,400 | 2,743,100 | 4,026,500 | 6,793,700 | 1,070,000 | 7,863,700 |
| Lake trout | 1,905,400 | 3,159,000 | 5,064,400 | 5,267,800 | 2,576,300 | 968,300 | 3,544,600 |
| Pike or pickerel (jacks) | 16,400 | 151,700 | 168,100 | 39,900 | 11,900 | 12,900 | 24,800 |
| Rock bass | 13,000 | (1) | 13,000 | 1,000 | | | |
| Sauger | 82,400 | (1) | 82,400 | 10,200 | 300 | (1) | 300 |
| Sheepshead | 2,700 | (1) | 2,700 | 14,400 | | | |
| Smelt | | | | 909,300 | | | |
| Steelhead trout | | | | 3,300 | | | |
| Sturgeon | | 21,900 | 21,900 | | | 3,600 | 3,600 |
| Sucker "mullet" | 1,924,200 | (1) | 1,924,200 | 1,739,300 | 198,400 | (1) | 198,400 |
| White bass | | | | 100 | | | |
| Whitefish: | | | | | | | |
| Common | 3,237,700 | 2,042,600 | 5,280,300 | 2,468,100 | 483,100 | 245,000 | 728,100 |
| Menominee | 61,100 | (1) | 61,100 | 131,200 | 27,900 | (1) | 27,900 |
| Yellow perch | 422,700 | 125,600 | 548,300 | 1,006,100 | 6,300 | 100 | 6,400 |
| Yellow pike | 1,640,900 | 455,500 | 2,096,400 | 169,600 | 26,500 | 87,800 | 114,300 |
| Crawfish | | | | 30,000 | | | |
| Mussel shells | | | | 808,200 | | | |
| Miscellaneous | | 491,100 | 491,100 | | | 43,800 | 43,800 |
| Total | 13,350,600 | 7,802,600 | 21,153,200 | 21,682,400 | 10,653,300 | 3,107,700 | 13,761,000 |

[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

*Lake fisheries of the United States and Canada, 1933*—Continued

CATCH: BY LAKES—Continued

| Species | Namakan Lake | | | Rainy Lake | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Burbot | 16,300 | (1) | 16,300 | 24,800 | (1) | 24,800 |
| Carp | | | | | 300 | 300 |
| Chubs | 19,800 | (1) | 19,800 | 5,000 | 2,400 | 7,400 |
| Crappie | 200 | (1) | 200 | | | |
| Pike or pickerel | 27,300 | 3,200 | 30,500 | 40,800 | 219,200 | 260,000 |
| Sturgeon | | 1,800 | 1,800 | 600 | (1) | 600 |
| Sucker "mullet" | 13,200 | (1) | 13,200 | 12,100 | (1) | 12,100 |
| Tullibees | | | | 13,400 | (1) | 13,400 |
| Whitefish, common | 9,200 | 11,700 | 20,900 | 120,700 | 17,400 | 138,100 |
| Yellow perch | 1,900 | (1) | 1,900 | 2,600 | 7,900 | 10,500 |
| Yellow pike | 36,200 | 10,600 | 46,800 | 61,500 | 201,100 | 262,600 |
| Miscellaneous | | | | | 2,900 | 2,900 |
| Total | 124,100 | 27,300 | 151,400 | 281,500 | 451,200 | 732,700 |

| Species | Lake of the Woods | | | Total, all lakes | | |
|---|---|---|---|---|---|---|
| | United States | Canada | Total | United States | Canada | Total |
| | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* | *Pounds* |
| Blue pike | | 800 | 800 | 9,013,200 | 4,214,400 | 13,227,600 |
| Bowfin | | | | 1,200 | (1) | 1,200 |
| Buffalofish | 100 | (1) | 100 | 1,500 | (1) | 1,500 |
| Burbot | 64,000 | (1) | 64,000 | 419,400 | (1) | 419,400 |
| Carp | 10,600 | 2,700 | 13,300 | 3,974,400 | 705,100 | 4,679,500 |
| Catfish and bullheads | 32,200 | 7,300 | 39,500 | 1,206,100 | 302,700 | 1,508,800 |
| Chubs | | | | 5,183,600 | 1,673,900 | 6,857,500 |
| Cisco | | | | 135,500 | (1) | 135,500 |
| Crappie | 2,400 | (1) | 2,400 | 2,600 | 177,700 | 180,300 |
| Eels | | | | 40,200 | 65,900 | 106,100 |
| Goldfish | | | | 99,500 | (1) | 99,500 |
| Lake herring | | | | 13,271,600 | 2,183,700 | 15,455,300 |
| Lake trout | 200 | 25,100 | 25,300 | 9,766,600 | 4,507,100 | 14,273,700 |
| Mooneye | 100 | (1) | 100 | 5,900 | (1) | 5,900 |
| Pike or pickerel | 260,200 | 433,900 | 694,100 | 405,300 | 1,097,600 | 1,502,900 |
| Rock bass | | | | 18,800 | (1) | 18,800 |
| Sauger | 242,500 | 2,200 | 244,700 | 2,554,000 | 2,200 | 2,556,200 |
| Sheepshead | | | | 3,023,900 | (1) | 3,023,900 |
| Smelt | | | | 909,300 | (1) | 909,300 |
| Steelhead trout | | | | 3,300 | (1) | 3,300 |
| Sturgeon | 800 | 100 | 900 | 20,900 | 56,000 | 76,900 |
| Sucker "mullet" | 168,300 | 400 | 168,700 | 5,603,400 | 400 | 5,603,800 |
| Sunfish | | | | 5,600 | (1) | 5,600 |
| Tullibees | 293,300 | 27,200 | 320,500 | 306,700 | 27,200 | 333,900 |
| White bass | | | | 395,300 | (1) | 395,300 |
| Whitefish: | | | | | | |
| Common | 13,300 | 411,000 | 424,300 | 7,369,700 | 3,911,300 | 11,281,000 |
| Menominee | | | | 220,200 | (1) | 220,200 |
| Yellow perch | 40,000 | 8,900 | 48,900 | 4,948,800 | 2,980,700 | 7,929,500 |
| Yellow pike | 670,600 | 773,900 | 1,444,500 | 3,793,400 | 1,802,800 | 5,596,200 |
| Crawfish | | | | 30,000 | (1) | 30,000 |
| Mussel shells | | | | 1,874,200 | (1) | 1,874,200 |
| Miscellaneous | | 72,600 | 72,600 | | 2,262,400 | 2,262,400 |
| Total | 1,798,600 | 1,766,100 | 3,564,700 | 74,604,100 | 25,971,100 | 100,575,200 |

[1] Where there has been a Canadian catch of these species it is included under Miscellaneous.

*Lake fisheries of the United States, 1933*

CATCH: BY STATES

| Species | New York | | Pennsylvania | | Ohio | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | 530,800 | $28,810 | 1,747,400 | $101,150 | 6,735,000 | $282,869 |
| Bowfin | 700 | 28 | | | | |
| Burbot | 1,000 | 62 | 1,000 | 10 | 250,000 | 5,502 |
| Carp | 6,300 | 150 | 4,100 | 91 | 1,283,800 | 24,390 |
| Catfish and bullheads | 69,200 | 6,430 | 9,600 | 551 | 914,200 | 51,956 |
| Cisco | 9,100 | 1,170 | 104,000 | 10,360 | 22,400 | 895 |
| Eels | 40,200 | 1,410 | | | | |
| Goldfish | | | | | 79,700 | 599 |
| Lake herring | 41,700 | 3,700 | | | | |
| Lake trout | 16,500 | 1,725 | 400 | 39 | | |
| Mooneye | | | | | 5,400 | 54 |
| Pike or pickerel (jacks) | 2,900 | 885 | | | | |
| Rock bass | 1,500 | 43 | | | | |
| Sauger | | | | | 2,151,800 | 83,921 |
| Sheepshead | | | 17,100 | 365 | 2,851,700 | 48,478 |
| Sturgeon | 19,000 | 5,535 | 500 | 110 | | |
| Sucker "mullet" | 39,500 | 1,415 | 22,600 | 455 | 1,341,200 | 20,119 |
| Sunfish | 5,600 | 154 | | | | |
| White bass | 2,700 | 378 | 46,800 | 1,740 | 345,700 | 11,755 |
| Whitefish, common | 172,300 | 31,265 | 664,300 | 92,500 | 197,100 | 25,618 |
| Yellow perch | 80,000 | 6,890 | 277,900 | 15,290 | 3,024,500 | 111,906 |
| Yellow pike | 13,900 | 1,530 | 19,800 | 2,130 | 1,054,800 | 72,781 |
| Mussel shells | | | | | 1,066,000 | 13,475 |
| Pearls and slugs | | | | | | 515 |
| Total | 1,052,900 | 91,580 | 2,915,500 | 224,791 | 21,323,300 | 754,833 |

| Species | Michigan | | Indiana | | Illinois | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 500 | $5 | | | | |
| Buffalofish | | | 1,400 | $60 | | |
| Burbot | 15,600 | 318 | | | | |
| Carp | 1,782,100 | 34,914 | 3,000 | 120 | | |
| Catfish and bullheads | 135,900 | 6,729 | | | | |
| Chubs | 1,051,900 | 90,717 | 226,000 | 18,100 | 640,000 | $51,200 |
| Goldfish | 19,800 | 149 | | | | |
| Lake herring | 3,618,300 | 65,623 | 78,000 | 3,120 | 72,000 | 2,200 |
| Lake trout | 6,129,200 | 661,620 | 90,000 | 8,100 | 262,000 | 23,600 |
| Mooneye | 400 | 3 | | | | |
| Pike or pickerel (jacks) | 39,300 | 3,067 | | | | |
| Rock bass | 17,300 | 1,208 | | | | |
| Sauger | 159,700 | 11,977 | | | | |
| Sheepshead | 154,800 | 2,843 | | | | |
| Smelt | 9,300 | 51 | | | | |
| Steelhead trout | | | 3,300 | 460 | | |
| Sucker "mullet" | 3,153,700 | 62,191 | 2,000 | 80 | | |
| White bass | 100 | 4 | | | | |
| Whitefish: | | | | | | |
| Common | 5,775,800 | 687,929 | 4,800 | 530 | 1,800 | 210 |
| Menominee | 170,800 | 13,138 | | | | |
| Yellow perch | 730,300 | 46,234 | 25,000 | 1,500 | 66,200 | 4,000 |
| Yellow pike | 1,910,400 | 191,294 | 4,000 | 500 | | |
| Mussel shells | | | 150,000 | 1,900 | | |
| Total | 24,875,200 | 1,880,014 | 587,500 | 34,470 | 1,042,000 | 81,210 |

| Species | Wisconsin | | Minnesota | | Total | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | | | 9,013,200 | $412,829 |
| Bowfin | | | | | 1,200 | 33 |
| Buffalofish | | | 100 | $1 | 1,500 | 61 |
| Burbot | 46,700 | $470 | 105,100 | 388 | 419,400 | 6,750 |
| Carp | 884,500 | 13,300 | 10,600 | 106 | 3,974,400 | 73,071 |
| Catfish and bullheads | 45,000 | 2,700 | 32,200 | 1,935 | 1,206,100 | 70,301 |
| Chubs | 3,150,000 | 252,000 | 115,700 | 9,143 | 5,183,600 | 421,160 |
| Cisco | | | | | 135,500 | 12,425 |
| Crappie | | | 2,600 | 238 | 2,600 | 238 |
| Eels | | | | | 40,200 | 1,410 |
| Goldfish | | | | | 99,500 | 748 |
| Lake herring | 4,259,000 | 63,850 | 5,202,600 | 78,563 | 13,271,600 | 217,056 |
| Lake trout | 3,041,000 | 298,500 | 227,500 | 24,146 | 9,766,600 | 1,017,730 |
| Mooneye | | | 100 | 1 | 5,900 | 58 |
| Pike or pickerel (jacks) | 34,800 | 2,720 | 328,300 | 9,644 | 405,300 | 16,316 |
| Rock bass | | | | | 18,800 | 1,251 |
| Sauger | | | 242,500 | 9,703 | 2,554,000 | 105,601 |

NOTE.—Statistics of operating units were not obtained for 1933.

*Lake fisheries of the United States, 1933*—Continued

CATCH: BY STATES—Continued

| Species | Wisconsin | | Minnesota | | Total | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Sheepshead | 300 | $9 | | | 3,023,900 | $51,695 |
| Smelt | 900,000 | 18,000 | | | 909,300 | 18,051 |
| Steelhead trout | | | | | 3,300 | 460 |
| Sturgeon | | | 1,400 | $281 | 20,900 | 5,926 |
| Sucker "mullet" | 850,600 | 23,320 | 193,800 | 2,065 | 5,603,400 | 109,645 |
| Sunfish | | | | | 5,600 | 154 |
| Tullibees | | | 306,700 | 846 | 306,700 | 846 |
| White bass | | | | | 395,300 | 13,877 |
| Whitefish: | | | | | | |
| Common | 404,000 | 47,100 | 149,600 | 11,174 | 7,369,700 | 896,326 |
| Menominee | 45,000 | 3,300 | 4,400 | 233 | 220,200 | 16,671 |
| Yellow perch | 700,400 | 35,025 | 44,500 | 1,822 | 4,948,800 | 222,667 |
| Yellow pike | 22,200 | 2,120 | 768,300 | 60,487 | 3,793,400 | 330,842 |
| Crawfish | 30,000 | 2,400 | | | 30,000 | 2,400 |
| Mussel shells | 658,200 | 7,900 | | | 1,874,200 | 23,275 |
| Pearls and slugs | | | | | | 515 |
| Total | 15,071,700 | 772,714 | 7,736,000 | 210,776 | 74,604,100 | 4,050,388 |

CATCH: BY LAKES

| Species | Lake Ontario | | Lake Erie | | | |
|---|---|---|---|---|---|---|
| | New York | | New York | | Pennsylvania | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | 226,800 | $13,460 | 304,000 | $15,350 | 1,747,400 | $101,150 |
| Bowfin | 700 | 28 | | | | |
| Burbot | 700 | 35 | 300 | 27 | 1,000 | 10 |
| Carp | 6,300 | 150 | | | 4,100 | 91 |
| Catfish and bullheads | 68,600 | 6,370 | 600 | 60 | 9,600 | 551 |
| Cisco | | | 9,100 | 1,170 | 104,000 | 10,360 |
| Eels | 40,200 | 1,410 | | | | |
| Lake herring | 41,700 | 3,700 | | | | |
| Lake trout | 12,400 | 1,325 | 4,100 | 400 | 400 | 39 |
| Pike or pickerel (jacks) | 2,900 | 885 | | | | |
| Rock bass | 1,400 | 42 | 100 | 1 | | |
| Sheepshead | | | | | 17,100 | 365 |
| Sturgeon | 13,300 | 3,805 | 5,700 | 1,730 | 500 | 110 |
| Sucker "mullet" | 23,100 | 1,200 | 16,400 | 215 | 22,600 | 455 |
| Sunfish | 5,600 | 154 | | | | |
| White bass | 800 | 48 | 1,900 | 330 | 46,800 | 1,740 |
| Whitefish, common | 40,400 | 4,840 | 131,900 | 26,425 | 664,300 | 92,500 |
| Yellow perch | 34,700 | 1,830 | 45,300 | 5,060 | 277,900 | 15,290 |
| Yellow pike | 7,200 | 730 | 6,700 | 800 | 19,800 | 2,130 |
| Total | 526,800 | 40,012 | 526,100 | 51,568 | 2,915,500 | 224,791 |

| Species | Lake Erie | | | | | |
|---|---|---|---|---|---|---|
| | Ohio | | Michigan | | Total | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | 6,735,000 | $282,869 | | | 8,786,400 | $399,364 |
| Bowfin | | | 400 | $4 | 400 | 9 |
| Burbot | 250,000 | 5,502 | 500 | 10 | 251,800 | 5,549 |
| Carp | 1,283,800 | 24,390 | 779,400 | 14,810 | 2,067,300 | 39,291 |
| Catfish and bullheads | 914,200 | 51,956 | 72,500 | 3,550 | 996,900 | 56,117 |
| Cisco | 22,400 | 895 | | | 135,500 | 12,425 |
| Goldfish | 79,700 | 599 | 19,800 | 149 | 99,500 | 748 |
| Lake trout | | | | | 4,500 | 439 |
| Mooneye | 5,400 | 54 | 400 | 3 | 5,800 | 57 |
| Pike or pickerel (jacks) | | | 5,900 | 134 | 5,900 | 134 |
| Rock bass | | | 3,300 | 102 | 3,400 | 103 |
| Sauger | 2,151,800 | 83,921 | 66,800 | 2,605 | 2,218,600 | 86,526 |
| Sheepshead | 2,851,700 | 48,478 | 138,000 | 2,347 | 3,006,800 | 51,190 |
| Sturgeon | | | | | 6,200 | 1,840 |
| Sucker "mullet" | 1,341,200 | 20,119 | 144,600 | 2,170 | 1,524,800 | 22,959 |
| White bass | 345,700 | 11,755 | | | 394,400 | 13,825 |
| Whitefish, common | 197,100 | 25,618 | 3,900 | 499 | 997,200 | 145,042 |
| Yellow perch | 3,024,500 | 111,906 | 86,800 | 3,208 | 3,434,500 | 135,464 |
| Yellow pike | 1,054,800 | 72,781 | 99,600 | 6,870 | 1,180,900 | 82,581 |
| Mussel shells [1] | 1,066,000 | 13,475 | | | 1,066,000 | 13,475 |
| Pearls and slugs [1] | | 515 | | | | 515 |
| Total | 21,323,300 | 754,833 | 1,421,900 | 36,461 | 26,186,800 | 1,067,653 |

[1] From tributary streams.

*Lake fisheries of the United States, 1933*—Continued

CATCH: BY LAKES—Continued

| Species | Lake Huron | | Lake Michigan | | | |
|---|---|---|---|---|---|---|
| | Michigan | | Michigan | | Indiana | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 100 | $1 | | | | |
| Buffalofish | | | | | 1,400 | $60 |
| Burbot | 2,700 | 27 | 8,800 | $245 | | |
| Carp | 971,900 | 19,794 | 30,700 | 309 | 3,000 | 120 |
| Catfish and bullheads | 62,000 | 3,105 | 1,400 | 74 | | |
| Chubs | 597,700 | 48,818 | 319,900 | 29,809 | 226,000 | 18,100 |
| Lake herring | 2,409,700 | 48,190 | 267,500 | 8,020 | 78,000 | 3,120 |
| Lake trout | 1,905,400 | 190,540 | 2,434,800 | 292,170 | 90,000 | 8,100 |
| Pike or pickerel (jacks) | 16,400 | 1,304 | 13,900 | 1,380 | | |
| Rock bass | 13,000 | 1,044 | 1,000 | 62 | | |
| Sauger | 82,400 | 8,230 | 10,200 | 1,112 | | |
| Sheepshead | 2,700 | 81 | 14,100 | 415 | | |
| Smelt | | | 9,300 | 51 | | |
| Steelhead trout | | | | | 3,300 | 460 |
| Sucker "mullet" | 1,924,200 | 48,080 | 966,700 | 9,673 | 2,000 | 80 |
| White bass | | | 100 | 4 | | |
| Whitefish: | | | | | | |
| Common | 3,237,700 | 388,490 | 2,129,500 | 234,230 | 4,800 | 530 |
| Menominee | 61,100 | 3,490 | 93,200 | 8,656 | | |
| Yellow perch | 422,700 | 29,660 | 214,900 | 12,900 | 25,000 | 1,500 |
| Yellow pike | 1,640,900 | 164,090 | 161,400 | 19,330 | 4,000 | 500 |
| Mussel shells [1] | | | | | 150,000 | 1,900 |
| Total | 13,350,600 | 954,944 | 6,677,400 | 618,440 | 587,500 | 34,470 |

| Species | Lake Michigan | | | | | |
|---|---|---|---|---|---|---|
| | Illinois | | Wisconsin | | Total | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Buffalofish | | | | | 1,400 | $60 |
| Burbot | | | 46,700 | $470 | 55,500 | 715 |
| Carp | | | 884,500 | 13,300 | 918,200 | 13,729 |
| Catfish and bullheads | | | 45,000 | 2,700 | 46,400 | 2,774 |
| Chubs | 640,000 | $51,200 | 2,850,000 | 228,000 | 4,035,900 | 327,109 |
| Lake herring | 72,000 | 2,200 | 3,609,000 | 54,100 | 4,026,500 | 67,440 |
| Lake trout | 262,000 | 23,600 | 2,481,000 | 248,100 | 5,267,800 | 571,970 |
| Pike or pickerel (jacks) | | | 26,000 | 2,100 | 39,900 | 3,480 |
| Rock bass | | | | | 1,000 | 62 |
| Sauger | | | | | 10,200 | 1,112 |
| Sheepshead | | | 300 | 9 | 14,400 | 424 |
| Smelt | | | 900,000 | 18,000 | 909,300 | 18,051 |
| Steelhead trout | | | | | 3,300 | 460 |
| Sucker "mullet" | | | 770,600 | 22,120 | 1,739,300 | 31,873 |
| White bass | | | | | 100 | 4 |
| Whitefish: | | | | | | |
| Common | 1,800 | 210 | 332,000 | 39,900 | 2,468,100 | 274,870 |
| Menominee | | | 38,000 | 3,000 | 131,200 | 11,656 |
| Yellow perch | 66,200 | 4,000 | 700,000 | 35,000 | 1,006,100 | 53,400 |
| Yellow pike | | | 4,200 | 420 | 169,600 | 20,250 |
| Crawfish | | | 30,000 | 2,400 | 30,000 | 2,400 |
| Mussel shells [1] | | | 658,200 | 7,900 | 808,200 | 9,800 |
| Total | 1,042,000 | 81,210 | 13,375,500 | 677,519 | 21,682,400 | 1,411,639 |

| Species | Lake Superior | | | | | |
|---|---|---|---|---|---|---|
| | Michigan | | Wisconsin | | Minnesota | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Burbot | 3,600 | $36 | | | | |
| Carp | 100 | 1 | | | | |
| Chubs | 134,300 | 12,090 | 300,000 | $24,000 | 90,900 | $9,087 |
| Lake herring | 941,100 | 9,413 | 650,000 | 9,750 | 5,202,600 | 78,563 |
| Lake trout | 1,789,000 | 178,910 | 560,000 | 50,400 | 227,300 | 24,129 |
| Pike or pickerel (jacks) | 3,100 | 249 | 8,800 | 620 | | |
| Sauger | 300 | 30 | | | | |
| Sucker "mullet" | 118,200 | 2,268 | 80,000 | 1,200 | 200 | 3 |
| Whitefish: | | | | | | |
| Common | 404,700 | 64,710 | 72,000 | 7,200 | 6,400 | 733 |
| Menominee | 16,500 | 992 | 7,000 | 300 | 4,400 | 233 |
| Yellow perch | 5,900 | 466 | 400 | 25 | | |
| Yellow pike | 8,500 | 1,004 | 18,000 | 1,700 | | |
| Total | 3,425,300 | 270,169 | 1,696,200 | 95,195 | 5,531,800 | 112,748 |

[1] From tributary streams.

*Lake fisheries of the United States, 1933*—Continued

CATCH: BY LAKES—Continued

| Species | Lake Superior | | Lake of the Woods, Rainy Lake, and Namakan Lake | | Total, all lakes | |
|---|---|---|---|---|---|---|
| | Total | | Minnesota | | | |
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Blue pike | | | | | 9,013,200 | $412,829 |
| Bowfin | | | | | 1,200 | 33 |
| Buffalofish | | | 100 | $1 | 1,500 | 61 |
| Burbot | 3,600 | $36 | 105,100 | 388 | 419,400 | 6,750 |
| Carp | 100 | 1 | 10,600 | 106 | 3,974,400 | 73,071 |
| Catfish and bullheads | | | 32,200 | 1,935 | 1,206,100 | 70,301 |
| Chubs | 525,200 | 45,177 | 24,800 | 56 | 5,183,600 | 421,160 |
| Cisco | | | | | 135,500 | 12,425 |
| Crappie | | | 2,600 | 238 | 2,600 | 238 |
| Eels | | | | | 40,200 | 1,410 |
| Goldfish | | | | | 99,500 | 748 |
| Lake herring | 6,793,700 | 97,726 | | | 13,271,600 | 217,056 |
| Lake trout | 2,576,300 | 253,439 | 200 | 17 | 9,766,600 | 1,017,730 |
| Mooneye | | | 100 | 1 | 5,900 | 58 |
| Pike or pickerel (jacks) | 11,900 | 869 | 328,300 | 9,644 | 405,300 | 16,316 |
| Rock bass | | | | | 18,800 | 1,251 |
| Sauger | 300 | 30 | 242,500 | 9,703 | 2,554,000 | 105,691 |
| Sheepshead | | | | | 3,023,900 | 51,695 |
| Smelt | | | | | 909,300 | 18,051 |
| Steelhead trout | | | | | 3,300 | 460 |
| Sturgeon | | | 1,400 | 281 | 20,900 | 5,926 |
| Sucker "mullet" | 198,400 | 3,471 | 193,600 | 2,062 | 5,603,400 | 109,645 |
| Sunfish | | | | | 5,600 | 154 |
| Tullibees | | | 306,700 | 846 | 306,700 | 846 |
| White bass | | | | | 395,300 | 13,877 |
| Whitefish: | | | | | | |
| Common | 483,100 | 72,643 | 143,200 | 10,441 | 7,369,700 | 896,326 |
| Menominee | 27,900 | 1,525 | | | 220,200 | 16,671 |
| Yellow perch | 6,300 | 491 | 44,500 | 1,822 | 4,948,800 | 222,667 |
| Yellow pike | 26,500 | 2,704 | 768,300 | 60,487 | 3,793,400 | 330,842 |
| Crawfish | | | | | 30,000 | 2,400 |
| Mussel shells [1] | | | | | 1,874,200 | 23,275 |
| Pearls and slugs [1] | | | | | | 515 |
| Total | 10,653,300 | 478,112 | 2,204,200 | 98,028 | 74,604,100 | 4,050,388 |

[1] From tributary streams.

## FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES[13]

The most recent complete catch statistics of the fisheries for the States of the Mississippi River and tributaries are those collected for the year 1931. The yield of fishery products in that year amounted to 82,382,523 pounds, valued at $2,897,357, which was a decrease of 22 percent in quantity and 36 percent in value as compared with the quantity and value of the catch in 1922 when the most recent preceding survey was made. Detailed statistics of the fisheries of the Mississippi River and tributaries for 1931 appear in Fishery Industries of the United States, 1932 by R. H. Fiedler, appendix III to the Report of the Commissioner of Fisheries for the fiscal year 1933. A summary of these fisheries in 1931 as well as certain data for 1934 appear in the following tables.

[13] For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of the document entitled "Statistical survey procedure."

*Fisheries of the Mississippi River and tributaries, 1931*

OPERATING UNITS: BY STATES

| Item | Alabama | Arkansas | Illinois | Indiana | Iowa | Kansas | Kentucky | Louisiana | Minnesota |
|---|---|---|---|---|---|---|---|---|---|
| Fishermen: | | | | | | | | | |
| On boats and shore: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 104 | 1,463 | 708 | 20 | 245 | 35 | 89 | 1,402 | 160 |
| Casual | 131 | 1,524 | 1,318 | 1,735 | 648 | 88 | 440 | 3,108 | 578 |
| Total | 235 | 2,987 | 2,026 | 1,755 | 893 | 123 | 529 | 4,510 | 738 |
| Boats: | | | | | | | | | |
| Motor | 32 | 907 | 676 | 544 | 309 | 18 | 92 | 1,225 | 65 |
| Other | 190 | 2,359 | 957 | 1,189 | 457 | 123 | 420 | 2,369 | 446 |
| Apparatus: | | | | | | | | | |
| Haul seines | | 16 | 127 | 50 | 133 | | 24 | 377 | 113 |
| Length, yards | | 7,308 | 33,975 | 5,170 | 36,339 | | 2,057 | 85,166 | 49,968 |
| Anchor gill nets | | 4 | | | | | | 74 | 9 |
| Square yards | | 2,800 | | | | | | 17,400 | 9,999 |
| Trammel nets | | 31 | 28 | 3 | | 90 | | 78 | |
| Square yards | | 3,899 | 4,890 | 360 | | 9,026 | | 19,696 | |
| Lines: | | | | | | | | | |
| Trot | 449 | 5,327 | 1,312 | 320 | 1,158 | 17 | 627 | 5,757 | 186 |
| Hooks | 35,980 | 455,000 | 124,715 | 16,767 | 186,250 | 360 | 37,395 | 1,392,200 | 41,800 |
| Pound nets | | | | | 2 | | | | 27 |
| Fyke nets | 610 | 5,346 | 9,852 | 335 | 1,981 | 189 | 1,231 | 5,908 | 74 |
| Dip nets | | | 22 | | 10 | | | 159 | |
| Traps: | | | | | | | | | |
| Crawfish | | | | | | | | 18 | |
| Shrimp | | | | | | | | 88 | |
| Baskets | | | 3,769 | | | | | | |
| Mussel dredges | | 426 | 14 | | | | | | |
| Yards at mouth | | 286 | 10 | | | | | | |
| Crowfoot bars | 168 | 1,038 | 840 | 1,092 | 464 | | 256 | 10 | 192 |
| Tongs | | 159 | | 72 | | | | 5 | |
| Rakes | | 70 | | | | | | | |
| Forks | | 102 | 33 | 1,278 | | 29 | | 5 | |
| Grabs | | | | | | | | 2,232 | |

| Item | Mississippi | Missouri | Nebraska | Ohio | Oklahoma | South Dakota | Tennessee | Texas | Wisconsin | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Fishermen: | | | | | | | | | | |
| On boats and shore: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 211 | 177 | | | 5 | | 327 | 5 | 202 | 5,153 |
| Casual | 198 | 170 | 299 | 49 | 19 | 67 | 206 | 41 | 112 | 10,731 |
| Total | 409 | 347 | 299 | 49 | 24 | 67 | 533 | 46 | 314 | 15,884 |
| Boats: | | | | | | | | | | |
| Motor | 138 | 84 | 30 | | | 2 | 138 | 6 | 160 | 4,426 |
| Other | 329 | 304 | 187 | 49 | 18 | 34 | 467 | 42 | 180 | 10,120 |
| Apparatus: | | | | | | | | | | |
| Haul seines | 16 | 47 | 12 | 2 | 2 | 11 | | | 83 | 1,013 |
| Length, yards | 6,885 | 5,668 | 906 | 180 | 60 | 1,948 | | | 20,149 | 255,779 |
| Anchor gill nets | 4 | 1 | | | 3 | | | | 6 | 101 |
| Square yards | 800 | 160 | | | 990 | | | | 13,488 | 45,637 |
| Trammel nets | 17 | 104 | 115 | | | | 52 | | | 518 |
| Square yards | 2,867 | 14,668 | 4,833 | | | | 3,560 | | | 63,799 |
| Lines: | | | | | | | | | | |
| Hand | | | | | | | 67 | | | 67 |
| Hooks | | | | | | | 67 | | | 67 |
| Trot | 847 | 516 | | 19 | 29 | 18 | 464 | 80 | 3 | 17,129 |
| Hooks | 72,155 | 34,600 | | 900 | 1,075 | 3,600 | 41,690 | 14,500 | 125 | 2,459,112 |
| Pound nets | | | | | | | | | 345 | 374 |
| Fyke nets | 2,591 | 1,872 | 296 | 76 | 85 | 68 | 1,735 | 70 | 222 | 32,541 |
| Dip nets | | | | | | | | | | 191 |
| Traps: | | | | | | | | | | |
| Crawfish | | | | | | | | | | 18 |
| Shrimp | 350 | | | | | | | | | 438 |
| Baskets | | | | | | | | | | 3,769 |
| Spears | | | | | | | 12 | | | 12 |
| Mussel dredges | | | | | | | | | | 440 |
| Yards at mouth | | | | | | | | | | 296 |
| Crowfoot bars | | | | | | | 230 | | 190 | 4,480 |
| Tongs | | 9 | | | | | | | | 245 |
| Rakes | | | | | | | | | | 70 |
| Forks | | | | | | | | | | 1,447 |
| Grabs | | | | | | | | | | 2,232 |

*Fisheries of the Mississippi River and tributaries, 1931*—Continued

CATCH: BY STATES

| Species | Alabama | | Arkansas | | Illinois | | Indiana | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | | | 700 | $28 | 8,308 | $241 | | |
| Buffalofish | 21,330 | $2,342 | 2,182,446 | 131,474 | 911,609 | 51,893 | 85,045 | $8,156 |
| Carp | 11,000 | 1,118 | 808,206 | 27,268 | 4,878,744 | 128,221 | 157,641 | 10,162 |
| Catfish and bullheads | 81,200 | 8,850 | 1,077,343 | 93,150 | 647,696 | 68,890 | 35,370 | 5,302 |
| Crappie | 9,772 | 1,004 | 11,325 | 227 | | | | |
| Eels | | | | | 4,985 | 322 | | |
| Mooneye | | | | | 1,000 | 20 | | |
| Paddlefish or spoonbill cat | 3,958 | 338 | 93,200 | 2,159 | 104,846 | 5,480 | 16,492 | 1,724 |
| Quillback or "American carp" | 7,657 | 875 | 6,830 | 676 | 17,532 | 608 | 30,312 | 1,436 |
| Sheepshead | 45,909 | 4,972 | 676,358 | 29,877 | 177,709 | 11,321 | 38,740 | 3,711 |
| Sturgeon, shovelnose | 575 | 70 | | | 39,766 | 3,448 | 3,013 | 292 |
| Sucker "mullet" | 5,752 | 609 | 3,309 | 235 | 25,130 | 1,087 | 16,797 | 1,156 |
| White bass | | | | | 1,200 | 92 | | |
| Yellow pike | | | | | | | 4,550 | 693 |
| Total | 187,153 | 20,178 | 4,859,717 | 285,094 | 6,818,525 | 271,623 | 387,960 | 32,632 |
| SHELLFISH, ETC. | | | | | | | | |
| Mussel shells | 1,635,000 | 10,132 | 10,872,790 | 108,819 | 7,429,528 | 82,894 | 7,328,736 | 105,632 |
| Pearls | | | | 3,137 | | 190 | | 125 |
| Slugs | | 2,444 | | 14,401 | | 11,835 | | 18,788 |
| Turtles: | | | | | | | | |
| Snapper | | | | | 14,577 | 696 | 500 | 25 |
| Soft shell | | | | | | | 400 | 20 |
| Total | 1,635,000 | 12,576 | 10,872,790 | 126,357 | 7,444,105 | 95,615 | 7,329,636 | 124,590 |
| Grand total | 1,822,153 | 32,754 | 15,732,507 | 411,451 | 14,262,630 | 367,238 | 7,717,596 | 157,222 |

| Species | Iowa | | Kansas | | Kentucky | | Louisiana [1] | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 91,825 | $3,759 | | | | | 5,715 | $114 |
| Buffalofish | 746,615 | 59,705 | 24,325 | $2,222 | 164,558 | $14,429 | 8,784,314 | 263,261 |
| Carp | 1,594,244 | 80,134 | 117,489 | 10,956 | 113,461 | 8,124 | 204,743 | 4,127 |
| Catfish and bullheads | 467,340 | 48,593 | 770 | 111 | 131,777 | 17,043 | 6,602,987 | 528,579 |
| Eels | 325 | 15 | | | | | 200 | 6 |
| Garfish | | | | | | | 72,450 | 791 |
| Mooneye | 1,100 | 28 | | | 990 | 105 | | |
| Paddlefish or spoonbill cat | 9,400 | 638 | | | 18,322 | 1,617 | 495,544 | 21,508 |
| Pike or pickerel | 4,700 | 470 | | | | | | |
| Quillback or "American carp" | 60,450 | 1,339 | 100 | 11 | 11,355 | 984 | 20,700 | 431 |
| Sauger | | | | | 2,365 | 451 | | |
| Sheepshead | 343,449 | 17,619 | | | 52,560 | 6,762 | 1,976,600 | 39,577 |
| Sturgeon, shovelnose | 17,650 | 1,663 | 175 | 24 | 2,967 | 380 | | |
| Sucker "mullet" | 36,550 | 822 | | | 10,294 | 1,331 | | |
| Yellow pike | | | | | 70 | 18 | | |
| Total | 3,373,648 | 214,785 | 142,859 | 13,324 | 508,719 | 51,244 | 18,163,253 | 858,394 |
| SHELLFISH, ETC. | | | | | | | | |
| Crawfish | | | | | | | 29,248 | 292 |
| Shrimp | | | | | | | 38,503 | 2,423 |
| Mussel shells | 4,366,219 | 65,685 | 312,562 | 2,713 | 1,113,032 | 8,786 | 50,000 | 375 |
| Pearls | | 7,244 | | | | | | |
| Slugs | | 13,924 | | 636 | | 852 | | |
| Frogs | | | | | | | 872,651 | 130,612 |
| Terrapin | 19,100 | 377 | | | | | | |
| Turtles: | | | | | | | | |
| Snapper | 2,000 | 40 | | | | | 58,013 | 2,244 |
| Soft shell | 17,000 | 340 | | | | | 1,700 | 34 |
| Total | 4,404,319 | 87,610 | 312,562 | 3,349 | 1,113,032 | 9,638 | 1,050,115 | 135,980 |
| Grand total | 7,777,967 | 302,395 | 455,421 | 16,673 | 1,621,751 | 60,882 | 19,213,368 | 994,374 |

[1] According to information furnished by the Louisiana Department of Conservation, the Louisiana catch from fresh-water sources during 1934 was as follows: Buffalofish, 8,579,200 pounds, valued at $428,957; catfish or bullheads, 3,070,000 pounds, valued at $245,000; paddlefish or spoonbill cat, 373,900 pounds, valued at $26,175; sheepshead, 249,100 pounds, valued at $12,928; diamond-back terrapin, 563 dozen, valued at $7,756; and turtles, 822,300 pounds, valued at $103,114.

*Fisheries of the Mississippi River and tributaries, 1931*—Continued

CATCH: BY STATES—Continued

| Species | Minnesota | | Mississippi | | Missouri | | Nebraska | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 16,598 | $282 | | | 17,000 | $520 | | |
| Buffalofish | 257,431 | 15,092 | 1,511,126 | $63,824 | 178,991 | 16,414 | 18,104 | $1,813 |
| Carp | 2,151,119 | 97,756 | 225,276 | 6,730 | 433,117 | 33,356 | 93,032 | 9,305 |
| Catfish and bullheads | 53,804 | 4,841 | 635,049 | 42,384 | 91,430 | 15,487 | 34,174 | 5,135 |
| Eels | | | 250 | 20 | 1,055 | 53 | | |
| Minnows | | | | | 525 | 208 | | |
| Paddlefish or spoonbill cat | | | 158,821 | 5,879 | 40,103 | 2,917 | | |
| Quillback or "American carp" | 17,246 | 519 | 2,157 | 42 | 13,672 | 946 | | |
| Sheepshead | 152,545 | 7,938 | 106,844 | 2,576 | 38,186 | 3,773 | | |
| Sturgeon, shovelnose | 1,634 | 115 | 100 | 3 | 17,282 | 1,703 | | |
| Sucker "mullet" | 65,273 | 1,955 | | | 2,275 | 292 | | |
| Total | 2,715,650 | 128,498 | 2,639,623 | 121,458 | 833,636 | 75,670 | 145,310 | 16,253 |
| SHELLFISH, ETC. | | | | | | | | |
| Shrimp | | | 10,000 | 1,500 | | | | |
| Mussel shells | 782,630 | 7,827 | | | 94,000 | 1,193 | | |
| Pearls | | 157 | | | | | | |
| Slugs | | 1,174 | | | | 118 | | |
| Turtles, snapper | | | 100 | 3 | | | | |
| Total | 782,630 | 9,158 | 10,100 | 1,503 | 94,000 | 1,311 | | |
| Grand total | 3,498,280 | 137,656 | 2,649,723 | 122,961 | 927,636 | 76,981 | 145,310 | 16,253 |

| Species | Ohio | | Oklahoma | | South Dakota | | Tennessee | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Black bass | | | | | | | 14,000 | $1,680 |
| Buffalofish | 6,433 | $662 | 21,605 | $2,142 | 38,926 | $3,894 | 478,592 | 34,244 |
| Carp | 14,370 | 1,543 | 4,268 | 425 | 52,836 | 2,642 | 247,841 | 9,597 |
| Catfish and bullheads | 4,380 | 811 | 4,935 | 695 | 13,500 | 3,528 | 271,753 | 24,750 |
| Crappie | | | | | 1,392 | 70 | 18,652 | 1,658 |
| Eels | | | | | | | 163 | 25 |
| Paddlefish or spoonbill cat | | | 5,332 | 533 | 400 | 40 | 5,034 | 301 |
| Quillback or "American carp" | 1,195 | 119 | 1,950 | 195 | 4,364 | 220 | 6,065 | 843 |
| Sheepshead | 1,318 | 224 | 1,550 | 155 | 697 | 70 | 197,670 | 10,465 |
| Sturgeon, shovelnose | 558 | 72 | | | | | 3,706 | 393 |
| Sucker "mullet" | 2,902 | 268 | | | 2,246 | 112 | 8,323 | 1,119 |
| Sunfish | | | | | | | 21,850 | 1,094 |
| White bass | | | | | | | 2,100 | 106 |
| Yellow pike | 325 | 60 | | | | | | |
| Total | 31,481 | 3,759 | 39,640 | 4,145 | 114,361 | 10,576 | 1,275,749 | 86,275 |
| SHELLFISH, ETC. | | | | | | | | |
| Mussel shells | 154,000 | 3,005 | | | | | 2,157,000 | 15,604 |
| Pearls | | | | | | | | 28 |
| Slugs | | 308 | | | | | | 1,724 |
| Frogs | | | | | | | 2,250 | 270 |
| Terrapin | | | | | | | 70 | 14 |
| Total | 154,000 | 3,313 | | | | | 2,159,320 | 17,640 |
| Grand total | 185,481 | 7,072 | 39,640 | 4,145 | 114,361 | 10,756 | 3,435,069 | 103,915 |

| Species | Texas | | Wisconsin | | Total | |
|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Black bass | | | | | 14,000 | $1,680 |
| Bowfin | | | 288,170 | $4,355 | 428,316 | 9,299 |
| Buffalofish | 73,000 | $2,190 | 268,001 | 13,528 | 15,772,451 | 687,288 |
| Carp | 6,900 | 138 | 777,474 | 23,800 | 11,891,761 | 455,399 |
| Catfish and bullheads | 47,800 | 3,824 | 65,539 | 5,825 | 10,266,847 | 877,798 |
| Crappie | | | | | 41,141 | 2,959 |
| Eels | | | | | 6,978 | 441 |
| Garfish | | | | | 72,450 | 791 |
| Minnows | | | | | 525 | 209 |
| Mooneye | | | | | 3,090 | 153 |
| Paddlefish or spoonbill cat | | | | | 951,452 | 43,134 |
| Pike or pickerel | | | | | 4,700 | 470 |
| Quillback or "American carp" | 500 | 10 | 66,353 | 2,032 | 268,438 | 11,286 |
| Sauger | | | | | 2,365 | 451 |
| Sheepshead | 10,300 | 206 | 84,409 | 3,692 | 3,904,844 | 142,938 |
| Sturgeon, shovelnose | | | | | 87,426 | 8,163 |
| Sucker "mullet" | | | 135,984 | 3,696 | 314,835 | 12,682 |
| Sunfish | | | | | 21,850 | 1,094 |
| White bass | | | | | 3,300 | 198 |
| Yellow pike | | | | | 4,945 | 771 |
| Total | 138,500 | 6,368 | 1,685,930 | 56,928 | 44,061,714 | 2,257,204 |

*Fisheries of the Mississippi River and tributaries, 1931*—Continued

CATCH: BY STATES—Continued

| Species | Texas | | Wisconsin | | Total | |
|---|---|---|---|---|---|---|
| SHELLFISH, ETC. | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Crawfish | | | | | 29, 248 | $292 |
| Shrimp | | | | | 48, 503 | 3, 923 |
| Mussel shells | | | 959, 200 | $8, 946 | 37, 254, 697 | 421, 611 |
| Pearls | | | | 555 | | 11, 436 |
| Slugs | | | | 2, 012 | | 68, 216 |
| Frogs | | | | | 874, 901 | 130, 882 |
| Terrapin | | | | | 19, 170 | 391 |
| Turtles: | | | | | | |
| Snapper | | | | | 75, 190 | 3, 008 |
| Soft shell | | | | | 19, 100 | 394 |
| Total | | | 959, 200 | 11, 513 | 38, 320, 809 | 640, 153 |
| Grand total | 138, 500 | $6, 368 | 2, 645, 130 | 68, 441 | 82, 382, 523 | 2, 897, 357 |

*Industries related to the fisheries of the Mississippi River and tributaries*

OPERATING UNITS, SALARIES, AND WAGES, 1931

| Item | Arkansas | Illinois | Indiana | Iowa | Kentucky | Louisiana | Minnesota and North Dakota |
|---|---|---|---|---|---|---|---|
| Transporting: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Persons engaged | 13 | | | | 11 | 5 | |
| Vessels, motor | 4 | | | | 2 | 2 | |
| Net tonnage | 69 | | | | 15 | 20 | |
| Wholesale and manufacturing: | | | | | | | |
| Establishments | 6 | 38 | 4 | 61 | 11 | 22 | 13 |
| Persons engaged: | | | | | | | |
| Proprietors | 3 | 42 | 1 | 52 | 8 | 24 | 11 |
| Salaried employees | 9 | 3 | 5 | 79 | 20 | 14 | 27 |
| Wage earners: | | | | | | | |
| Average for season | 152 | 331 | 140 | 2, 500 | 261 | 70 | 112 |
| Average for year | 72 | 235 | 93 | 2, 179 | 159 | 68 | 112 |
| Paid to salaried employees | $11, 417 | $9, 520 | $6, 820 | $141, 346 | $33, 159 | $12, 400 | $55, 200 |
| Paid to wage earners | $53, 503 | $145, 683 | $51, 444 | $1, 417, 678 | $81, 643 | $37, 700 | $81, 500 |
| Total salaries and wages | $64, 920 | $155, 203 | $58, 264 | $1, 559, 024 | $114, 802 | $50, 100 | $136, 700 |
| Fishermen manufacturing | | 4 | 2 | | | 200 | |

| Item | Mississippi | Missouri and Oklahoma | Nebraska and Kansas | Ohio and Pennsylvania | Tennessee | Wisconsin | Total |
|---|---|---|---|---|---|---|---|
| Transporting: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Persons engaged | | | | | | | 29 |
| Vessels, motor | | | | | | | 8 |
| Net tonnage | | | | | | | 104 |
| Wholesale and manufacturing: | | | | | | | |
| Establishments | 6 | 21 | 3 | 13 | 11 | 8 | 217 |
| Persons engaged: | | | | | | | |
| Proprietors | 7 | 24 | 3 | 17 | 9 | 3 | 204 |
| Salaried employees | 3 | 125 | 8 | 37 | 15 | 10 | 355 |
| Wage earners: | | | | | | | |
| Average for season | 26 | 328 | 52 | 175 | 90 | 38 | 4, 275 |
| Average for year | 26 | 261 | 52 | 145 | 52 | 29 | 3, 483 |
| Paid to salaried employees | $16, 000 | $291, 874 | $17, 400 | $95, 878 | $34, 884 | $12, 998 | $738, 896 |
| Paid to wage earners | $22, 382 | $202, 944 | $45, 580 | $138, 817 | $38, 177 | $24, 483 | $2, 341, 534 |
| Total salaries and wages | $38, 382 | $494, 818 | $62, 980 | $234, 695 | $73, 061 | $37, 481 | $3, 080, 430 |
| Fishermen manufacturing | 7 | 3 | | | | | 216 |

*Industries related to the fisheries of the Mississippi River and tributaries*—Continued

PRODUCTS MANUFACTURED

| Item | Indiana | | Iowa | | Kansas, Kentucky, Illinois, and Missouri | |
|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing establishments: | | | | | | |
| Salmon, smoked ... pounds | | | 240,000 | $48,800 | | |
| Sturgeon, smoked ... do | | | 162,000 | 39,140 | | |
| Mussel-shell products: | | | | | | |
| Buttons [2] ... gross | | | 11,422,475 | 2,849,520 | (1) | (1) |
| Poultry feed [2] ... tons | (3) | (3) | 6,340 | 37,514 | (1) | (1) |
| Lime [2] ... do | | | 1,600 | 3,925 | (1) | (1) |
| Unclassified [2] | | | | [4] 102,396 | | [5] $78,896 |
| Unclassified, smoked ... pounds | | | [6] 83,000 | [6] 14,440 | | |
| Total | | | | 3,095,735 | | 78,896 |
| By fishermen: | | | | | | |
| Carp, smoked ... pounds | | | | | 667 | 67 |
| Paddlefish roe, salted ... do | 450 | $180 | | | 900 | 540 |
| Sheepshead, smoked ... do | | | | | 617 | 77 |
| Sturgeon: | | | | | | |
| Smoked ... do | | | | | 1,333 | 400 |
| Roe, salted ... do | | | | | 35 | 32 |
| Total | 450 | 180 | | | 3,552 | 1,116 |
| Grand total | 450 | 180 | | 3,095,735 | 3,552 | 80,012 |

| Item | Louisiana | | Minnesota and Nebraska | | Mississippi | | Tennessee, Ohio, and Pennsylvania | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| By manufacturing establishments: | | | | | | | | |
| Salmon, smoked ... pounds | | | (1) | (1) | | | (1) | (1) |
| Sturgeon, smoked ... do | | | (1) | (1) | | | | |
| Whitefish, smoked ... do | | | 255,000 | $47,200 | | | | |
| Unclassified, smoked ... do | | | [7] 66,600 | [7] 19,793 | | | [8] 291,500 | [8] $77,205 |
| Total | | | 321,600 | 66,993 | | | [8] 291,500 | [8] 77,205 |
| By fishermen: | | | | | | | | |
| Alligator hides ... pounds | 88,356 | $7,363 | | | | | | |
| Paddlefish roe, salted ... do | | | | | 245 | $92 | | |
| Total | 88,356 | 7,363 | | | 245 | 92 | | |
| Grand total | 88,356 | 7,363 | 321,600 | 66,993 | 245 | 92 | 291,500 | 77,205 |

[1] The production of this item is included under unclassified products.
[2] Data are for 1934.
[3] A small production of poultry feed has been included with the unclassified mussel-shell products of Kansas, Kentucky, Illinois, and Missouri.
[4] Includes the production of mussel-shell stucco, novelties, and colored shell chips.
[5] Includes the production of mussel-shell buttons, poultry feed, and lime.
[6] Includes the production of smoked buffalofish and tullibees.
[7] Includes the production of smoked eels, salmon, and sturgeon.
[8] Includes the production of smoked buffalofish, butterfish, carp, chubs, lake trout, paddlefish, sablefish, salmon, and tullibees.

NOTE.—Unless otherwise indicated the data are for 1931. The total value of the manufactured products for the States of the Mississippi River and tributaries was as follows: By manufacturing establishments, $3,318,829, and by fishermen, $8,751. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State.

## LAKE PEPIN

*Fisheries of Lake Pepin, 1934*

OPERATING UNITS: By gear

| Item | Haul seines | Anchor gill nets | Trot lines | Fyke nets | Total, exclusive of duplication |
|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 12 | 8 | | 6 | 14 |
| Casual | 44 | 22 | 8 | 9 | 54 |
| Total | 56 | 30 | 8 | 15 | 68 |
| Boats: | | | | | |
| Motor | 16 | 20 | 6 | 15 | 35 |
| Other | 16 | 12 | 2 | 7 | 31 |
| Apparatus: | | | | | |
| Number | 16 | 38 | 8 | 130 | |
| Length, yards | 3,720 | | | | |
| Square yards | | 26,000 | | | |
| Hooks | | | 800 | | |

CATCH: By gear

| Species | Haul seines | | Anchor gill nets | | Trot lines | | Fyke nets | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 3,000 | $60 | | | | | | | 3,000 | $60 |
| Buffalofish | 9,000 | 270 | 2,500 | $75 | | | 3,800 | $114 | 15,300 | 459 |
| Carp | 221,000 | 4,420 | 100,000 | 2,000 | 800 | $16 | 47,500 | 950 | 369,300 | 7,386 |
| Catfish and bullheads | 2,600 | 260 | 4,300 | 430 | 4,000 | 400 | 11,200 | 1,120 | 22,100 | 2,210 |
| Eels | | | | | | | 100 | 10 | 100 | 10 |
| Mooneye | 4,000 | 80 | | | | | | | 4,000 | 80 |
| Sheepshead | 5,900 | 285 | 900 | 45 | 1,000 | 40 | 1,200 | 56 | 9,000 | 426 |
| Sucker "mullet" | 9,000 | 160 | 2,500 | 50 | | | 1,000 | 20 | 12,500 | 230 |
| Turtles: | | | | | | | | | | |
| Snapper | 500 | 10 | | | | | | | 500 | 10 |
| Soft shell | 500 | 10 | | | | | | | 500 | 10 |
| Total | 255,500 | 5,555 | 110,200 | 2,600 | 5,800 | 456 | 64,800 | 2,270 | 436,300 | 10,881 |

OPERATING UNITS: By States

| Item | Minnesota | Wisconsin | Total for lake |
|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* |
| Regular | | 14 | 14 |
| Casual | 10 | 44 | 54 |
| Total | 10 | 58 | 68 |
| Boats: | | | |
| Motor | 7 | 28 | 35 |
| Other | 4 | 27 | 31 |
| Apparatus: | | | |
| Haul seines | 2 | 14 | 16 |
| Length, yards | 400 | 3,320 | 3,720 |
| Gill nets, anchor | | 38 | 38 |
| Square yards | | 26,000 | 26,000 |
| Lines, trot | 8 | | 8 |
| Hooks | 800 | | 800 |
| Fyke nets | | 130 | 130 |

*Fisheries of Lake Pepin, 1934*—Continued

CATCH: BY STATES

| Species | Minnesota | | Wisconsin | | Total for lake | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | | | 3,000 | $60 | 3,000 | $60 |
| Buffalofish | 1,500 | $45 | 13,800 | 414 | 15,300 | 459 |
| Carp | 14,800 | 296 | 354,500 | 7,090 | 369,300 | 7,386 |
| Catfish and bullheads | 4,400 | 440 | 17,700 | 1,770 | 22,100 | 2,210 |
| Eels | | | 100 | 10 | 100 | 10 |
| Mooneye | | | 4,000 | 80 | 4,000 | 80 |
| Sheepshead | 3,500 | 155 | 5,500 | 271 | 9,000 | 426 |
| Sucker "mullet" | 500 | 10 | 12,000 | 220 | 12,500 | 230 |
| Turtles: | | | | | | |
| Snapper | 300 | 6 | 200 | 4 | 500 | 10 |
| Soft shell | 300 | 6 | 200 | 4 | 500 | 10 |
| Total | 25,300 | 958 | 411,000 | 9,923 | 436,300 | 10,881 |

## LAKE KEOKUK

*Fisheries of Lake Keokuk, 1934*

OPERATING UNITS: BY GEAR

| Item | Haul seines | Anchor gill nets | Trammel nets | Trot lines | Fyke nets | Total, exclusive of duplication |
|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 12 | | | | 10 | 14 |
| Casual | 77 | 6 | 6 | 51 | 59 | 97 |
| Total | 89 | 6 | 6 | 51 | 69 | 111 |
| Boats: | | | | | | |
| Motor | 23 | 6 | 6 | 30 | 44 | 60 |
| Other | 25 | | | 23 | 34 | 54 |
| Apparatus: | | | | | | |
| Number | 29 | 6 | 6 | 93 | 1,340 | |
| Length, yards | 8,000 | | | | | |
| Square yards | | 1,000 | 300 | | | |
| Hooks | | | | 11,600 | | |

CATCH: BY GEAR

| Species | Haul seines | | Gill nets | | Trot lines | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 1,000 | $20 | | | | |
| Buffalofish | 51,300 | 1,569 | 1,000 | $30 | | |
| Carp | 263,000 | 5,260 | 10,000 | 200 | 14,000 | $280 |
| Catfish and bullheads | 10,300 | 1,030 | 500 | 50 | 12,800 | 1,280 |
| Paddlefish or spoonbill cat | 14,400 | 1,340 | | | | |
| Pike or pickerel | 1,500 | 75 | | | | |
| Sheepshead | 78,900 | 3,945 | 3,000 | 150 | 10,000 | 525 |
| Sucker "mullet" | 3,000 | 60 | | | | |
| Turtles: | | | | | | |
| Snapper | 4,200 | 84 | | | 1,000 | 21 |
| Soft shell | 1,050 | 21 | | | | |
| Total | 428,650 | 13,404 | 14,500 | 430 | 37,800 | 2,106 |

*Fisheries of Lake Keokuk, 1934*—Continued

CATCH: By gear—Continued

| Species | Fyke nets | | Trammel nets | | Total | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | | | | | 1,000 | $20 |
| Buffalofish | 30,300 | $949 | 2,000 | $60 | 84,600 | 2,608 |
| Carp | 60,500 | 1,210 | 5,000 | 100 | 352,500 | 7,050 |
| Catfish and bullheads | 82,900 | 8,290 | 2,000 | 200 | 108,500 | 10,850 |
| Paddlefish or spoonbill cat | | | | | 14,400 | 1,340 |
| Pike or pickerel | 500 | 25 | | | 2,000 | 100 |
| Sheepshead | 36,600 | 1,830 | 5,000 | 250 | 133,500 | 6,700 |
| Sucker "mullet" | 2,400 | 48 | 500 | 10 | 5,900 | 118 |
| Turtles: | | | | | | |
| Snapper | 300 | 6 | | | 5,500 | 111 |
| Soft shell | 100 | 2 | | | 1,150 | 23 |
| Total | 213,600 | 12,360 | 14,500 | 620 | 709,050 | 28,920 |

OPERATING UNITS: By States

| Item | Illinois | Iowa | Total for lake |
|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* |
| Regular | 4 | 10 | 14 |
| Casual | 49 | 48 | 97 |
| Total | 53 | 58 | 111 |
| Boats: | | | |
| Motor | 32 | 28 | 60 |
| Other | 30 | 24 | 54 |
| Apparatus: | | | |
| Haul seines | 13 | 16 | 29 |
| Length, yards | 3,000 | 5,000 | 8,000 |
| Gill nets, anchor | | 6 | 6 |
| Square yards | | 1,000 | 1,000 |
| Trammel nets | | 6 | 6 |
| Square yards | | 300 | 300 |
| Lines, trot | 48 | 45 | 93 |
| Hooks | 5,600 | 6,000 | 11,600 |
| Fyke nets | 770 | 570 | 1,340 |

CATCH: By States

| Species | Illinois | | Iowa | | Total for lake | |
|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | | | 1,000 | $20 | 1,000 | $20 |
| Buffalofish | 19,100 | $643 | 65,500 | 1,965 | 84,600 | 2,608 |
| Carp | 112,000 | 2,240 | 240,500 | 4,810 | 352,500 | 7,050 |
| Catfish and bullheads | 70,500 | 7,050 | 38,000 | 3,800 | 108,500 | 10,850 |
| Paddlefish or spoonbill cat | 10,000 | 900 | 4,400 | 440 | 14,400 | 1,340 |
| Pike or pickerel | | | 2,000 | 100 | 2,000 | 100 |
| Sheepshead | 35,500 | 1,800 | 98,000 | 4,900 | 133,500 | 6,700 |
| Sucker "mullet" | 400 | 8 | 5,500 | 110 | 5,900 | 118 |
| Turtles: | | | | | | |
| Snapper | 1,700 | 34 | 3,800 | 77 | 5,500 | 111 |
| Soft shell | 400 | 8 | 750 | 15 | 1,150 | 23 |
| Total | 249,600 | 12,683 | 459,450 | 16,237 | 709,050 | 28,920 |

## FISHERIES OF THE MISSISSIPPI RIVER BETWEEN LAKE PEPIN AND LAKE KEOKUK

*Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1934*

OPERATING UNITS: By gear

| Item | Haul seines | Anchor gill nets | Trammel nets | Trot-lines | Pound nets | Fyke nets | Dip nets | Total, exclusive of duplication |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 101 | | 10 | | | 145 | | 164 |
| Casual | 301 | 9 | 70 | 254 | 4 | 354 | 11 | 548 |
| Total | 402 | 9 | 80 | 254 | 4 | 499 | 11 | 712 |
| Boats: | | | | | | | | |
| Motor | 154 | 6 | 78 | 172 | 2 | 366 | | 434 |
| Other | 154 | 3 | 7 | 83 | 2 | 130 | | 292 |
| Apparatus: | | | | | | | | |
| Number | 163 | 7 | 80 | 411 | 10 | 13,215 | 11 | |
| Length, yards | 42,450 | | | | | | | |
| Square yards | | 2,600 | 5,900 | | | | | |
| Hooks | | | | 66,175 | | | | |

CATCH: By gear

| Species | Haul seines | | Anchor gill nets | | Trammel nets | | Trot lines | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 83,950 | $1,689 | | | | | | |
| Buffalofish | 283,300 | 8,499 | 6,500 | $195 | 45,600 | $1,368 | | |
| Carp | 1,329,000 | 26,580 | 15,500 | 310 | 57,000 | 1,100 | 56,900 | $1,138 |
| Catfish and bullheads | 49,000 | 4,900 | 950 | 95 | 10,200 | 1,020 | 89,600 | 8,960 |
| Eels | 300 | 25 | | | | | 200 | 10 |
| Mooneye | 31,100 | 622 | | | | | | |
| Paddlefish or spoonbill cat | 8,000 | 800 | | | 600 | 60 | | |
| Pike or pickerel | 8,500 | 485 | | | | | | |
| Sheepshead | 313,300 | 15,650 | 4,300 | 215 | 23,600 | 1,177 | 33,700 | 1,681 |
| Sturgeon, shovelnose | 9,450 | 945 | 750 | 75 | 34,700 | 3,470 | | |
| Sucker "mullet" | 93,150 | 1,863 | 2,100 | 42 | 5,900 | 128 | | |
| Turtles: | | | | | | | | |
| Snapper | 25,900 | 524 | | | | | 500 | 10 |
| Soft shell | 12,400 | 248 | | | | | | |
| Total | 2,247,350 | 62,830 | 30,100 | 932 | 177,600 | 8,323 | 180,900 | 11,799 |

| Species | Pound nets | | Fyke nets | | Dip nets | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | | | 600 | $12 | | | 84,550 | $1,701 |
| Buffalofish | 3,000 | $90 | 377,100 | 11,348 | 5,500 | $165 | 721,000 | 21,665 |
| Carp | 44,000 | 880 | 647,000 | 12,850 | 5,000 | 100 | 2,154,400 | 42,958 |
| Catfish and bullheads | 1,000 | 100 | 446,150 | 44,615 | 100 | 10 | 597,000 | 59,700 |
| Eels | | | 950 | 85 | | | 1,450 | 120 |
| Mooneye | | | 5,000 | 100 | | | 36,100 | 722 |
| Paddlefish or spoonbill cat | | | | | | | 8,600 | 860 |
| Pike or pickerel | | | | | | | 8,500 | 485 |
| Sheepshead | 3,000 | 150 | 231,300 | 11,548 | 3,500 | 175 | 612,700 | 30,596 |
| Sturgeon, shovelnose | | | 300 | 30 | | | 45,200 | 4,520 |
| Sucker "mullet" | 2,000 | 40 | 47,100 | 942 | 100 | 2 | 150,350 | 3,017 |
| Turtles: | | | | | | | | |
| Snapper | | | 200 | 4 | | | 26,600 | 538 |
| Soft shell | | | | | | | 12,400 | 248 |
| Total | 53,000 | 1,260 | 1,755,700 | 81,534 | 14,200 | 452 | 4,458,850 | 167,130 |

*Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1934*—Continued

OPERATING UNITS: BY STATES

| Item | Illinois | Iowa | Minnesota | Wisconsin | Total |
|---|---|---|---|---|---|
| Fishermen: | *Number* | *Number* | *Number* | *Number* | *Number* |
| Regular | 30 | 92 | 2 | 40 | 164 |
| Casual | 157 | 218 | 59 | 114 | 548 |
| Total | 187 | 310 | 61 | 154 | 712 |
| Boats: | | | | | |
| Motor | 116 | 203 | 25 | 90 | 434 |
| Other | 86 | 120 | 41 | 45 | 292 |
| Apparatus: | | | | | |
| Haul seines | 42 | 66 | 15 | 40 | 163 |
| Length, yards | 9,750 | 17,900 | 3,100 | 11,700 | 42,450 |
| Gill nets, anchor | | | 3 | 4 | 7 |
| Square yards | | | 500 | 2,100 | 2,600 |
| Trammel nets | 4 | 74 | | 2 | 80 |
| Square yards | 400 | 5,300 | | 200 | 5,900 |
| Lines, trot | 150 | 176 | 41 | 44 | 411 |
| Hooks | 25,700 | 31,400 | 4,900 | 4,175 | 66,175 |
| Pound nets | | 10 | | | 10 |
| Fyke nets | 3,940 | 6,840 | 120 | 2,315 | 13,215 |
| Dip nets | | 11 | | | 11 |

CATCH: BY STATES

| Species | Illinois | | Iowa | | Minnesota | | Wisconsin | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Bowfin | 3,300 | $66 | 36,350 | $727 | 4,900 | $108 | 40,000 | $800 | 84,550 | $1,701 |
| Buffalofish | 183,300 | 5,499 | 342,700 | 10,281 | 33,000 | 990 | 162,000 | 4,895 | 721,000 | 21,665 |
| Carp | 396,800 | 7,936 | 963,300 | 19,226 | 132,500 | 2,560 | 661,800 | 13,236 | 2,154,400 | 42,958 |
| Catfish and bullheads | 162,600 | 16,260 | 311,900 | 31,190 | 27,750 | 2,775 | 94,750 | 9,475 | 597,000 | 59,700 |
| Eels | 600 | 50 | 450 | 40 | 200 | 10 | 200 | 20 | 1,450 | 120 |
| Mooneye | | | 5,200 | 104 | 2,600 | 52 | 28,300 | 566 | 36,100 | 722 |
| Paddlefish or spoonbill cat | 2,100 | 210 | 5,500 | 550 | | | 1,000 | 100 | 8,600 | 860 |
| Pike or pickerel | 8,500 | 485 | | | | | | | 8,500 | 485 |
| Sheepshead | 199,700 | 9,985 | 254,400 | 12,694 | 29,000 | 1,446 | 129,600 | 6,471 | 612,700 | 30,596 |
| Sturgeon, shovelnose | 7,000 | 700 | 35,950 | 3,595 | | | 2,250 | 225 | 45,200 | 4,520 |
| Sucker "mullet" | 22,000 | 440 | 60,600 | 1,222 | 13,900 | 278 | 53,850 | 1,077 | 150,350 | 3,017 |
| Turtles: | | | | | | | | | | |
| Snapper | 4,400 | 88 | 8,600 | 178 | 2,400 | 48 | 11,200 | 224 | 26,600 | 538 |
| Soft shell | 2,750 | 55 | 4,350 | 87 | 1,000 | 20 | 4,300 | 86 | 12,400 | 248 |
| Total | 993,050 | 41,774 | 2,029 300 | 79,894 | 247,250 | 8,287 | 1,189,250 | 37,175 | 4,458,850 | 167,130 |

## FISHERIES OF ALASKA [14]

The commercial catch of fishery products in Alaska during 1934, exclusive of whales, amounted to 809,914,821 pounds, valued at $11,706,935, which is an increase of 29 percent both in volume and value as compared with the catch in 1933. Of the total catch in 1934, 624,651,388 pounds, valued at $9,881,113, consisted of salmon; 182,531,160 pounds, valued at $1,660,234, other fish; and 2,732,273 pounds, valued at $165,588, shellfish. In addition, 465 whales were taken. These fisheries gave employment to 9,433 fishermen, 1,758 persons on transporting craft, and 14,999 persons in fisheries wholesale and manufacturing industries—a total of 26,190 persons, which is an increase of 21 percent as compared with the number employed in 1933.

[14] Statistics for the fisheries of Alaska are collected and compiled by the Alaska Division of this Bureau. A summary of these statistics appear in this section. For detailed figures the reader is referred to Alaska Fishery and Fur-Seal Industries in 1934, by Ward T. Bower, Appendix I to the Report of the Commissioner of Fisheries for the fiscal year 1935.

*Fisheries of Alaska, 1934*

SUMMARY: BY DISTRICTS

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| PERSONS ENGAGED | *Number* | *Value* | *Number* | *Value* | *Number* | *Value* | *Number* | *Value* |
| In fishing | 4,190 | | 2,206 | | 3,037 | | 9,433 | |
| In transporting | 704 | | 669 | | 385 | | 1,758 | |
| In wholesale and manufacturing industries | 6,632 | | 4,274 | | 4,093 | | 14,999 | |
| Total | 11,526 | | 7,149 | | 7,515 | | 26,190 | |
| CRAFT EMPLOYED | | | | | | | | |
| Vessels fishing | 566 | | 60 | | 10 | | 636 | |
| Boats fishing | 1,745 | | 1,210 | | 1,320 | | 4,275 | |
| Vessels transporting | 167 | | 133 | | 78 | | 378 | |
| Scows, houseboats, pile drivers, etc | 273 | | 251 | | 184 | | 708 | |
| Total | 2,751 | | 1,654 | | 1,592 | | 5,997 | |
| CATCH | | | | | | | | |
| Fish: | *Pounds* | | *Pounds* | | *Pounds* | | *Pounds* | |
| Salmon | 267,661,090 | $3,816,263 | 184,875,472 | $2,927,888 | 172,114,826 | $3,136,962 | 624,651,388 | $9,881,113 |
| Other | 128,783,475 | 1,390,332 | 48,925,923 | 245,773 | 4,821,762 | 24,129 | 182,531,160 | 1,660,234 |
| Shellfish | 1,249,670 | 70,672 | 1,482,603 | 94,916 | | | 2,732,273 | 165,588 |
| Total | 397,694,235 | 5,277,267 | 235,283,998 | 3,268,577 | 176,936,588 | 3,161,091 | 809,914,821 | 11,706,935 |
| | *Number* | | *Number* | | *Number* | | *Number* | |
| Whales | | | 237 | | 228 | | 465 | |
| WHOLESALE AND MANUFACTURING | | | | | | | | |
| Establishments | 95 | | 91 | | 45 | | 231 | |
| PRODUCTS AS PREPARED FOR MARKET | *Pounds* | | *Pounds* | | *Pounds* | | *Pounds* | |
| Salmon | 168,971,402 | 14,965,741 | 112,471,299 | 11,481,916 | 91,142,786 | 12,301,818 | 372,585,487 | 38,749,475 |
| Herring | 46,864,093 | 925,737 | 20,719,675 | 550,037 | 2,822,450 | 127,250 | 70,406,218 | 1,603,024 |
| Halibut | 13,221,338 | 804,785 | | | | | 13,221,338 | 804,785 |
| Cod | | | 309,360 | 12,767 | 183,545 | 7,139 | 492,905 | 19,906 |
| Trout | 66,113 | 4,987 | 1,500 | 30 | | | 67,613 | 5,017 |
| Sablefish | 215,344 | 9,499 | | | | | 215,344 | 9,499 |
| Flounder | 270,000 | 4,000 | | | | | 270,000 | 4,000 |
| Rockfish | 4,294 | 142 | | | | | 4,294 | 142 |
| Clam | 852 | 144 | 390,342 | 188,522 | | | 391,194 | 188,666 |
| Shrimp | 379,248 | 119,423 | 2,208 | 688 | | | 381,456 | 120,111 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Crab | 288,316 | 93,516 | 354,832 | 114,147 | | | 643,148 | 207,663 |
| Whale | | | 4,246,375 | 109,246 | 5,107,500 | 141,759 | 9,353,875 | 251,005 |
| Total | 230,281,000 | 16,927,974 | 138,495,591 | 12,457,353 | 99,256,281 | 12,577,966 | 468,032,872 | 41,963,293 |

OPERATING UNITS: By districts

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* |
| Fishermen | 4,190 | 2,206 | 3,037 | 9,433 |
| Vessels fishing: | | | | |
| Steam | | 3 | 4 | 7 |
| Net tonnage | | 201 | 340 | 541 |
| Motor | 566 | 57 | 6 | 629 |
| Net tonnage | 7,236 | 1,386 | 192 | 8,814 |
| Boats fishing: | | | | |
| Motor | 721 | 256 | 45 | 1,022 |
| Other | 1,024 | 954 | 1,275 | 3,253 |
| Apparatus: | | | | |
| Traps | 290 | 169 | | 459 |
| Purse seines | 388 | 159 | 6 | 553 |
| Yards | 129,714 | 39,440 | 3,360 | 172,514 |
| Haul seines | 4 | 136 | | 140 |
| Yards | 800 | 26,556 | | 27,356 |
| Gill nets | 304 | 985 | 2,420 | 3,709 |
| Yards | 42,030 | 105,730 | 324,792 | 472,552 |

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| Apparatus—Continued | *Number* | *Number* | *Number* | *Number* |
| Beam trawls | 12 | | | 13 |
| Wheels | | | 262 | 262 |
| Lines: | | 34 | | |
| Hand lines (cod fishery) | | 4 | 35 | 69 |
| Trawl lines (cod fishery) | | | 1 | 5 |
| Troll lines (salmon fishery) | 3,207 | | | 3,207 |
| Skates of lines (halibut fishery) | 2,498 | 1,191 | | 2,498 |
| Crab pots | 1,660 | 11 | | 2,851 |
| Herring pounds | 9 | 2 | | 20 |
| Herring pound seines | 9 | | | 11 |
| | | 1 | | |

CATCH: By districts

[Estimated round weight and value to the fishermen]

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| FISH | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | 8,693,181 | $200,127 | 57,913,163 | $1,252,703 | 158,850,377 | $3,057,017 | 225,456,721 | $4,509,847 |
| Chinook or king | 6,780,640 | 191,500 | 2,151,200 | 49,271 | 2,261,300 | 29,421 | 11,193,140 | 270,192 |
| Chum or keta | 34,249,590 | 368,755 | 28,150,713 | 290,570 | 10,736,181 | 46,852 | 73,136,484 | 706,177 |
| Humpback or pink | 201,311,560 | 2,765,636 | 90,675,972 | 1,234,177 | 165,720 | 2,073 | 292,153,252 | 4,001,886 |
| Silver or coho | 16,626,119 | 290,245 | 5,984,424 | 101,167 | 101,248 | 1,599 | 22,711,791 | 393,011 |
| Herring | 113,383,883 | 566,919 | 48,040,770 | 240,204 | 4,212,612 | 21,063 | 165,637,265 | 828,186 |
| Halibut | 14,690,375 | 804,785 | | | | | 14,690,375 | 804,785 |
| Cod | | | 877,653 | 5,539 | 609,150 | 3,066 | 1,486,803 | 8,605 |

## *Fisheries of Alaska, 1934*—Continued

CATCH: BY DISTRICTS—Continued

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| FISH—continued | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| Trout: | | | | | | | | |
| Dolly Varden | 33, 272 | $2, 526 | 7, 500 | $30 | | | 40, 772 | $2, 556 |
| Steelhead | 52, 657 | 2, 461 | | | | | 52, 657 | 2, 461 |
| Sablefish | 316, 682 | 9, 499 | | | | | 316, 682 | 9, 499 |
| Flounders | 300, 000 | 4, 000 | | | | | 300, 000 | 4, 000 |
| Rockfishes | 6, 606 | 142 | | | | | 6, 606 | 142 |
| Total | 396, 444, 565 | 5, 206, 595 | 233, 801, 395 | 3, 173, 661 | 176, 936, 588 | $3, 161, 091 | 807, 182, 548 | 11, 541, 347 |
| SHELLFISH | | | | | | | | |
| Crabs | 561, 517 | 46, 758 | 697, 904 | 57, 074 | | | 1, 259, 421 | 103, 832 |
| Shrimp | 686, 449 | 23, 885 | 4, 015 | 138 | | | 690, 464 | 24, 023 |
| Clams: | | | | | | | | |
| Butter | 1, 704 | 29 | | | | | 1, 704 | 29 |
| Razor | | | 780, 684 | 37, 704 | | | 780, 684 | 37, 704 |
| Total | 1, 249, 670 | 70, 672 | 1, 482, 603 | 94, 916 | | | 2, 732, 273 | 165, 588 |
| Grand total | 397, 694, 235 | 5, 277, 267 | 235, 283, 998 | 3, 268, 577 | 176, 936, 588 | 3, 161, 091 | 809, 914, 821 | 11, 706, 935 |

NOTE.—In addition to the above, 465 whales were taken in Alaska waters. The round weight and value to the fishermen cannot be determined, but the products amounted to 9,353,875 pounds, valued at $251,005.

## *Industries related to the fisheries of Alaska, 1934*

TRANSPORTING

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* |
| Persons engaged | 704 | 669 | 385 | 1, 758 |
| Vessels transporting: | | | | |
| Steam | | | 11 | 11 |
| Net tonnage | | | 19, 967 | 19, 967 |

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| Vessels transporting—Continued. | *Number* | *Number* | *Number* | *Number* |
| Motor | 167 | 133 | 67 | 367 |
| Net tonnage | 4, 974 | 4, 644 | 4, 442 | 14, 060 |
| Scows, houseboats, pile drivers, etc | 273 | 251 | 184 | 708 |

WHOLESALE AND MANUFACTURING

| Item | Southeast Alaska | Central Alaska | Western Alaska | Total |
|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* |
| Persons engaged | 6,632 | 4,274 | 4,093 | 14,999 |
| Establishments: | | | | |
| Handling fresh and frozen fish | 44 | 4 | | 48 |
| Curing fish | 36 | 39 | 26 | 101 |
| Canning fish | 51 | 51 | 23 | 125 |
| Manufacturing byproducts | 9 | 5 | 1 | 15 |
| Total (exclusive of duplication) | 95 | 91 | 45 | 231 |

PRODUCTS AS PREPARED FOR MARKET

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| FRESH | | | | | | | | |
| Salmon (for food) | 1,385,789 | $69,837 | | | | | 1,385,789 | $69,837 |
| Salmon (for bait and fox feed) | 24,600 | 150 | 2,000 | $10 | | | 26,600 | 160 |
| Herring (for bait) | 2,117,160 | 21,201 | 1,241,625 | 10,663 | | | 3,358,785 | 31,864 |
| Halibut | 7,253,775 | 444,525 | | | | | 7,253,775 | 444.525 |
| Trout | 23,372 | 1,441 | | | | | 23,372 | 1,441 |
| Sablefish | 9,075 | 349 | | | | | 9,075 | 349 |
| Flounders | 270,000 | 4,000 | | | | | 270,000 | 4,000 |
| Rockfishes | 1,100 | 30 | | | | | 1,100 | 30 |
| Crabs: | | | | | | | | |
| Meat | 68,082 | 21,254 | 3,880 | 1,164 | | | 71,962 | 22,418 |
| Whole in shell | 15,115 | 696 | 11,760 | 497 | | | 26,875 | 1,193 |
| Shrimp: | | | | | | | | |
| Meat | 375,015 | 118,619 | 2,208 | 688 | | | 377,223 | 119,307 |
| Whole in shell | 3,780 | 525 | | | | | 3,780 | 525 |
| Total | 11,546,863 | 682,627 | 1,261,473 | 13,022 | | | 12,808,336 | 695,649 |
| FROZEN | | | | | | | | |
| Salmon (for food) | 5,316,574 | 334,812 | | | | | 5,316,574 | 331,812 |
| Salmon (for bait) | 99,700 | 450 | | | | | 99,700 | 450 |
| Herring (for bait) | 3,009,765 | 20,229 | | | | | 3,009,765 | 20,229 |
| Halibut | 5,967,563 | 360,260 | | | | | 5,967,563 | 360,260 |
| Trout | 31,341 | 2,443 | | | | | 31,341 | 2,443 |
| Sablefish | 206,069 | 9,138 | | | | | 206,069 | 9,138 |
| Rockfishes | 3,194 | 112 | | | | | 3,194 | 112 |
| Total | 14,634,206 | 727,444 | | | | | 14,634,206 | 727,414 |

*Fisheries of Alaska, 1934*—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* | *Pounds* | *Value* |
| **CURED** | | | | | | | | |
| Salmon: | | | | | | | | |
| Mild cured | 3, 162, 400 | $559, 329 | 12, 800 | $1, 298 | 357, 600 | $55, 484 | 3, 532, 800 | $616, 111 |
| Pickled | | | 254, 400 | 17, 432 | 133, 050 | 11, 555 | 387, 450 | 28, 987 |
| Dried, kippered, and dry salted | | | 35, 450 | 1, 794 | 1, 404, 200 | 56, 300 | 1, 439, 650 | 58, 094 |
| Herring: | | | | | | | | |
| Pickled (for bait) | | | 23, 400 | 166 | | | 23, 400 | 166 |
| Pickled (for food): | | | | | | | | |
| Scotch cure | 2, 137, 075 | 119, 791 | 3, 251, 875 | 225, 323 | 2, 020, 250 | 100, 362 | 7, 409, 200 | 445, 476 |
| Norwegian cure | 21, 790 | 965 | | | 208, 750 | 7, 333 | 230, 540 | 8, 298 |
| Roused | | | | | 513, 050 | 16, 854 | 513, 050 | 16, 854 |
| Spiced | 2, 600 | 390 | 40, 400 | 770 | | | 43, 000 | 1, 160 |
| Dry salted | | | | | 80, 400 | 2, 701 | 80, 400 | 2, 701 |
| Cod: | | | | | | | | |
| Dry salted | | | 170, 800 | 6, 119 | 181, 545 | 7, 039 | 352, 345 | 13, 158 |
| Pickled | | | 115, 160 | 4, 245 | 2, 000 | 100 | 117, 160 | 4, 345 |
| Stock fish | | | 23, 400 | 2, 403 | | | 23, 400 | 2, 403 |
| Trout, dried | | | 1, 500 | 30 | | | 1, 500 | 30 |
| Sablefish, pickled | 200 | 12 | | | | | 200 | 12 |
| Total | 5, 324, 065 | 680, 487 | 3, 929, 185 | 259, 580 | 4, 900, 845 | 257, 728 | 14, 154, 095 | 1, 197, 795 |
| **CANNED** | | | | | | | | |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | 5, 011, 104 | 772, 186 | 34, 054, 560 | 4, 896, 176 | 87, 079, 104 | 11, 980, 292 | 126, 144, 768 | 17, 648, 654 |
| Chinook or king | 748, 512 | 114, 433 | 1, 366, 656 | 191, 207 | 422, 256 | 56, 259 | 2, 537, 424 | 361, 899 |
| Chum or keta | 18, 922, 176 | 1, 435, 921 | 15, 035, 184 | 1, 138, 541 | 1, 593, 408 | 127, 383 | 35, 550, 768 | 2, 701, 845 |
| Humpback or pink | 125, 873, 376 | 10, 823, 571 | 57, 593, 856 | 4, 834, 099 | 94, 032 | 8, 132 | 183, 561, 264 | 15, 665, 802 |
| Silver or coho | 7, 609, 296 | 834, 932 | 3, 665, 808 | 392, 545 | 58, 512 | 6, 273 | 11, 333, 616 | 1, 233, 750 |
| Miscellaneous fish | 11, 400 | 1, 103 | | | 624 | 140 | 12, 024 | 1, 243 |
| Clams | 852 | 144 | 390, 342 | 188, 522 | | | 391, 194 | 188, 666 |
| Crabs | 205, 119 | 71, 566 | 339, 192 | 112, 486 | | | 544, 311 | 184, 052 |
| Shrimp | 453 | 279 | | | | | 453 | 279 |
| Total | 158, 382, 288 | 14, 054, 135 | 112, 445, 598 | 11, 753, 576 | 89, 247, 936 | 12, 178, 479 | 360, 075, 822 | 37, 986, 190 |
| **BYPRODUCTS** | | | | | | | | |
| Fertilizer: | | | | | | | | |
| Salmon | 702, 000 | 10, 530 | 313, 560 | 4, 703 | | | 1, 015, 560 | 15, 233 |
| Whale | | | 1, 330, 000 | 18, 389 | 1, 368, 000 | 19, 116 | 2, 698, 000 | 37, 505 |
| Meal, herring | 19, 956, 468 | 316, 604 | 7, 954, 000 | 125, 613 | | | 27, 910, 468 | 442, 217 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Oil: | | | | | | | | |
| Salmon | 115,875 | 9,590 | 137,025 | 4,111 | | | 252,900 | 13,701 |
| Herring | 19,619,235 | 446,557 | 8,208,375 | 187,502 | | | 27,827,610 | 634,059 |
| Whale | | | 2,844,375 | 88,745 | 3,237,750 | 107,925 | 6,082,125 | 196,670 |
| Sperm | | | 72,000 | 2,112 | 501,750 | 14,718 | 573,750 | 16,830 |
| Total | 40,393,578 | 783,281 | 20,859,335 | 431,175 | 5,107,500 | 141,759 | 66,360,413 | 1,356,215 |
| Grand total | 230,281,000 | 16,927,974 | 138,495,591 | 12,457,353 | 99,256,281 | 12,577,966 | 468,032,872 | 41,963,293 |

NOTE.—Halibut products include all taken by the Alaska fleet, some of which were landed at other than Alaska ports. The total landings in Alaska in 1934 amounted to 7,151,669 pounds, valued at $398,337.

*Supplementary table showing the pack of canned products in "standard cases"*[1]

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* | *Cases* | *Value* |
| Salmon: | | | | | | | | |
| Blueback, red or sockeye | 104,398 | $772,186 | 709,470 | $4,896,176 | 1,814,148 | $11,980,292 | 2,628,016 | $17,648,654 |
| Chinook or king | 15,594 | 114,433 | 28,472 | 191,207 | 8,797 | 56,259 | 52,863 | 361,899 |
| Chum or keta | 394,212 | 1,435,921 | 313,233 | 1,138,541 | 33,196 | 127,383 | 740,641 | 2,701,845 |
| Humpback or pink | 2,622,362 | 10,823,571 | 1,199,872 | 4,834,099 | 1,959 | 8,132 | 3,824,193 | 15,665,802 |
| Silver or coho | 158,527 | 834,932 | 76,371 | 392,545 | 1,219 | 6,273 | 236,117 | 1,233,750 |
| Miscellaneous fish | 238 | 1,103 | | | 13 | 140 | 251 | 1,243 |
| Clams | 57 | 144 | 26,023 | 188,522 | | | 26,080 | 188,666 |
| Crabs | 4,273 | 71,566 | 7,067 | 112,486 | | | 11,340 | 184,052 |
| Shrimp | 26 | 279 | | | | | 26 | 279 |
| Total | 3,299,687 | 14,054,135 | 2,360,508 | 11,753,576 | 1,859,332 | 12,178,479 | 7,519,527 | 37,986,190 |

[1] The pack of salmon, miscellaneous fish, and crabs has been converted to "standard cases" of 48 1-pound cans, clams to "standard cases" of 48 no. 1 5-ounce cans, and shrimp to "standard cases" of 48 5¾-ounce cans.

*Supplementary table showing the output of byproducts in tons and gallons*

| Item | Southeast Alaska | | Central Alaska | | Western Alaska | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* | *Quantity* | *Value* |
| Fertilizer: | | | | | | | | |
| Salmon ... tons | 351 | $10,530 | 157 | $4,703 | | | 508 | $15,233 |
| Whale ... do | | | 665 | 18,389 | 684 | $19,116 | 1,349 | 37,505 |
| Meal, herring ... do | 9,978 | 316,604 | 3,977 | 125,613 | | | 13,955 | 442,217 |
| Oil: | | | | | | | | |
| Salmon ... gallons | 15,450 | 9,590 | 18,270 | 4,111 | | | 33,720 | 13,701 |
| Herring ... do | 2,615,898 | 446,557 | 1,094,450 | 187,502 | | | 3,710,348 | 634,059 |
| Whale ... do | | | 379,250 | 88,745 | 431,700 | 107,925 | 810,950 | 196,670 |
| Sperm ... do | | | 9,600 | 2,112 | 66,900 | 14,718 | 76,500 | 16,830 |
| Total | | 783,281 | | 431,175 | | 141,759 | | 1,356,215 |

## STATISTICAL SURVEY PROCEDURE

In order that those who use the statistical data contained in this report and previous reports of the Division of Fishery Industries may be informed as to the source of the figures and methods for their collection, it has been deemed advisable to outline in considerable detail the statistical survey procedure followed by the Division. This procedure has been developed over a period of years, and changes in method have been made at times where such changes have appeared to work toward general improvement. While the surveys in the several sections are not made in the same manner owing to varying facilities and records in different States, an attempt has been made to make the data collected by the various methods in the producing areas comparable with respect to the same year as well as over a period of years. Throughout the entire plan it has been the intention to coordinate State and Federal fishery statistical work so that there will be as little duplication of effort as possible. The procedure will be discussed under two main heads—"Sectional surveys" and "Local and special surveys."

### SECTIONAL SURVEYS

Statistical surveys of the fisheries and fishery industries of the various sections of the United States occupy by far the greatest part of the time of the statistical personnel of the Division. It is in the course of these surveys that the statistical and marketing agents visit the individual fishing localities of the various States to collect statistics of the volume of the catch of fish and its value, employment in fishing, quantity of fishing gear, number and classification of fishing and transporting craft, employment in wholesale and manufacturing establishments, and the volume and value of manufactured fishery products and byproducts. The various phases of these surveys are discussed in detail in the sections following.

*History.*—The first comprehensive statistical survey of the fisheries and fishery industries of the United States was made for the year 1880 by George Brown Goode, Assistant Director of the United States National Museum and associates, with the cooperation of the Commissioner of Fisheries and the Superintendent of the Tenth Census. Data for specific fisheries or restricted sections for years prior to 1880 were also collected in this early survey and recorded in Mr. Goode's reports. The survey for 1880, however, did not include the Mississippi River and tributaries. Periodic general surveys of a limited number of States or limited areas of the United States were made for various of the intervening years between 1880 and 1908 and from 1909 to 1928. In 1908 a survey of the entire United States was made. The next general survey of the entire United States was not made until 1931 although complete data for all sections excluding the Mississippi River and tributaries were collected for 1929 and 1930 and complete data on the catch and operating units of the fisheries were collected for 1932. In the latter survey, however, lack of sufficient funds prohibited collection of data on wholesale and manufacturing firms except those data collected as a part of the canned fishery products and byproducts surveys. A complete general canvass was made of the New England, Middle Atlantic, Chesapeake, and Pacific States for 1933, and a similar canvass was

made of the Chesapeake, South Atlantic, Gulf, Pacific, and Lakes States, for 1934.

Following is a summary indicating the years for which statistics were collected on the fisheries and fishery industries in the various sections. Figures for the more recent years are available for free distribution from the Bureau in bulletin form, but figures for the earlier years are available only in the various printed reports of the Bureau. These reports are available for reference in the Bureau's library and at many public libraries.

In the New England States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1889, 1898, 1902, 1905, 1908, 1919, 1924, 1928, 1929, 1930, 1931, 1932, and 1933. For most of these years data on operating units and wholesale and manufacturing trade also were collected. In addition to the above, a partial statistical survey was made for the entire section in 1892; a partial survey of the fisheries in Maine, New Hampshire, and Massachusetts for the fiscal year 1897; the lobster fishery for 1900 and 1913; the oyster fishery for 1910; the shad and alewife fisheries for 1896; the menhaden industry for 1912; the fisheries of Massachusetts for 1879; and the fisheries of Connecticut for 1925 and 1926.

Statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of the Middle Atlantic States were collected for the years 1880, 1887, 1888, 1889, 1890, 1891, 1897, 1898, 1901, 1904, 1908, 1921, 1926, 1929, 1930, 1931, 1932, and 1933. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to these a statistical survey was made of the coastal fisheries of these States in 1915; catch in all States except New York, in 1892; the shad and alewife fisheries in 1896; the shad fisheries of the Delaware River in 1910; the shad fisheries of the Chesapeake Bay and tributaries in 1909; the menhaden industry in 1912; the lobster fisheries in 1900 and 1913; and the oyster fishery in 1911. The years for which statistics are available on the shad fishery of the Hudson River are given in the section entitled "Shad and alewife fisheries."

In the Chesapeake Bay States statistics on the catch of the marine fisheries and those conducted in coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1890, 1891, 1897, 1901, 1904, 1908, 1920, 1925, 1929, 1930, 1931, 1932, 1933, and 1934. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the crab fishery for 1915; the oyster fishery and menhaden industry for 1912; and the shad and alewife fisheries for 1896, 1909, and 1915. The years for which statistics of the shad and alewife fisheries of the Potomac River are available are given in the section entitled "Shad and alewife fisheries."

In the South Atlantic and Gulf States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1889, 1890, 1897, 1902, 1908, 1918, 1923, 1927, 1928, 1929, 1930, 1931, 1932, and 1934. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the fisheries of these States, excluding Florida and Alabama, for 1887; the shad fishery of the South Atlantic

States for 1910; the shad and alewife fisheries of the South Atlantic States for 1896; the sturgeon fishery of Florida for 1900; the menhaden industry of the South Atlantic States for 1912; the shrimp fishery for 1916; the oyster fishery of the South Atlantic States for 1910; and the oyster fishery of the Gulf States for 1911.

In the Pacific Coast States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1892, 1895, 1899, 1904, 1908, 1915, and for all the years from 1922 to 1934, inclusive. These surveys have usually included data on operating units and wholesale and manufacturing trade. In addition to the above, statistics were obtained on the fisheries of California from 1918 to 1921, inclusive, and for the oyster fishery in 1912.

Statistics on the catch of the fisheries of the Great Lakes were collected for the years 1880, 1885, 1890, 1893, 1899, 1903, 1908, and for all the years from 1913 to 1934, inclusive. Statistics of the operating units and of the wholesale and manufacturing trade were collected for most of the years when canvasses were made from 1880 to 1908 and in 1917 and 1922 as well as in most of the years from 1926 to 1934, inclusive. In addition to the above a survey was made of the fisheries of Lake Ontario and of certain fisheries in other lakes for the year 1897.

Statistics of the catch of the fisheries of the Mississippi River and its tributaries were collected for the years 1894, 1899, 1903, 1908, 1922, and 1931. In addition, figures have been obtained of the fisheries of Lakes Pepin and Keokuk for the years 1914 and 1917 and the years from 1927 to 1934, inclusive, and of the fisheries of the Mississippi River between Lakes Pepin and Keokuk for the years 1929 to 1934, inclusive.

Statistics also were collected on the fisheries of certain interior waters, other than the fisheries of the Great Lakes and the Mississippi River and its tributaries, for the years 1894, 1895, 1900, and 1902.

*Statistical agents.*—The statistics contained in this volume have been collected by a corps of trained statistical and marketing agents which comprises a part of the permanent staff of the Division of Fishery Industries of the Bureau. Most of these men have been with the Bureau for a period of 5 years or more. In the main they are college graduates and were recruited through civil-service examination. While in college, most of the men pursued biological or technical courses largely in fishery work which has especially suited them for coping with the many biological and technical aspects encountered in canvassing the fisheries. This training has been especially helpful in identification of the species which, because of the many local names applied to a particular species, causes considerable confusion.

*Period covered.*—In conducting the fishery statistical surveys, agents are dispatched to the districts to be surveyed as early in the calendar year as they can be spared from the tabulation and preparation for publication of their previous season's work. They collect statistics of fishery operations for the year preceding that in which they are working; and, since their field work occupies the greater part of the year, it is usually at least a year from the end of the calendar year for which they are collecting data until the figures are published. Most of the figures are collected for the calendar year. Where there are variations from this general practice, explanatory notes appear in the tables. Prior to 1930, statistics on the catch of oysters in the Atlantic and Gulf

States were collected for the oyster season; that is, from September to April, inclusive. Beginning with 1930 and down to the present, they have been collected on the basis of the calendar year.

*Scope.*—The scope of the coastal statistical surveys includes canvasses of the commercial fisheries of the oceans and bays and of the coastal rivers as far inland as commercial fishing is important. This usually coincides with the range of commercial fishing for anadromous species. Statistics of the fisheries of the Mississippi River cover canvasses of the fisheries of the Mississippi River proper as well as all of its tributaries wherein commercial fishing for either fish, crustaceans, or mollusks is prosecuted. Statistics of the fisheries of the Great Lakes cover canvasses of the fisheries prosecuted in the Lakes proper, adjacent bays, and the international lakes of northern Minnesota, as well as rivers which sustain a commercial fishery having outlets into these waters. Surveys for statistics of the wholesale and manufacturing fishery industries cover such plants located in the coastal, river, and lake areas adjacent to the waters mentioned above.

*Methods of collection.*—Several methods for the collection of fishery statistics are employed, each of which has been carefully studied to obtain the best results with the available personnel and funds. In most instances the agents obtain lists of the names of fishing vessels, names or numbers of motor boats, and names of owners of these craft from local customs officials. Also it often is possible to obtain the names of licensed commercial fishermen and occasionally some statistics on the catch from several of the State fishery agencies; from other State, county, or city agencies; or from private organizations.

With such preliminary records as are available for their guidance the agents then visit each fishing community in their field unless their preliminary records are so complete that personal visits in some areas may be eliminated. While it is impossible for the few agents available for this work to interview each fisherman in a given locality, the more important ones are visited, and a sufficient number of those of lesser importance are interviewed to obtain reliable information on their production. In practice virtually all wholesale firms are visited, as well as captains of fishing vessels (those of 5 net tons or over), and also most of the more important inshore fishermen.

In the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained in recent years from the State fishery agencies in the collection of statistics that only fragmentary surveys need be made by the Bureau's agents to obtain the necessary data. Also the State fishery agencies in Maryland and Virginia recently have developed very complete statistical systems which greatly facilitate the Bureau's canvasses in these States.

As regards the fisheries of the Great Lakes and international lakes of northern Minnesota the Bureau obtains most of the catch statistics and usually the value of the catch direct from the records of the State fishery agency. To obtain data on the number of fishermen, boats, vessels, and gear the Bureau conducts such personal surveys among the fishermen as may be necessary to supplement the State records.

Bureau agents are stationed at Seattle, Wash., and Terminal Island, Calif., who survey the fisheries of the Pacific Coast States. As a rule they obtain figures on the volume of the catch from the records of the several State fishery agencies. In most cases the value of the

catch is derived from dealers' records and sometimes from estimates of prices. In Washington and Oregon the offshore fisheries are surveyed separately by the Bureau's agent to obtain the number of operating units, catch, and value of the catch. Statistics of the wholesale fishery industry for this section are obtained largely by personal interviews of the agents.

In the administration of the Alaska fisheries the Bureau obtains sworn statements concerning their activities from those prosecuting the fisheries in this area. These statements are compiled by the Alaska Division of this Bureau.

Statistics of the volume of the catch of fish of the Pacific Coast States are usually shown in weights as landed, which may be in the round or dressed condition. Statistics on the volume of the catch of fish taken in the remainder of the United States are shown in round weight.

The figures in the tables for shellfish represent the weight of the meats in the case of univalve and bivalve mollusks and gastropods, and the round weight of crustaceans and such mollusks as squid and octupus.

*Shore and vessel fisheries.*—In general, statistics of the shore fisheries as collected by the agents include data, on the number of casual and regular fishermen; number and tonnage of motor and other fishing boats and accessory boats; kind and quantity of gear used, and the volume, value, and method of capture of each species caught by boats (for our purpose craft of less than 5 net tons, capacity are called "boats") for each locality or group of localities. This method is not followed in some sections where the availability of data collected by the State fishery agencies obviates the necessity of detailed locality surveys.

Statistics of the vessel fisheries include data on the number of the crew, rig of vessel, net tonnage, kind and quantity of gear used, accessory boats carried, and volume, value, and method of capture of each species caught by each vessel (for our purpose craft of 5 net tons' capacity or more are called "vessels"). As in the shore fisheries, the availability of figures collected by State fishery agencies may eliminate the necessity of our agents collecting these data for each vessel.

All persons engaged in commercial fishing operations are included as fishermen. For our purpose these have been divided into "regular" and "casual" fishermen. Regular fishermen are those who receive more than one-half of their annual income from fishing; and casual fishermen are those whose principal business is something other than fishing, and who receive less than one-half of their annual compensation from fishing.

The catch of fish is credited to the principal port of arrival and departure of the craft rather than its point of ownership, registration, documentation, or its port of landing. This accounts for catches of fish being shown in areas where they are not common since fishing vessels frequently fish in areas far from their principal fishing port.

*Wholesale and manufacturing trade.*—All persons or firms engaged in the wholesale buying and selling of fishery products or who produce manufactured fishery products are surveyed under this title. Where the business of fishing and wholesaling or manufacturing is combined, that part of the business devoted to either of the latter two phases

is included in the wholesale and manufacturing survey and the part devoted to fishing is included in the shore or vessel fisheries. If a wholesale business is conducted with no manufacturing and the business is so small that the full time of one man over the whole year or season is not required, it is then disregarded as a wholesale business. If commodities other than fishery products are handled the persons engaged, and salaries and wages paid, are prorated; and only that part concerned with fishery products is included. If such a firm requires less than the full time of one man over the whole year or season and if it does not manufacture, it is not included in the canvass. Retail firms that manufacture or whose wholesale business exceeds the retail part are included. Persons or firms engaged in the motor trucking of fishery products are included as wholesalers if they are engaged in wholesale buying and selling.

Buyers for a central firm are not canvassed as wholesale dealers unless they ship direct to the firm's customers from the buying point.

Fishermen or fishing concerns, except manufacturers, who do not buy fishery products are not included under this heading except that oyster-shucking firms are included provided shuckers are employed and irrespective of whether all or part of the oysters used are taken from the firms' privately owned beds.

Manufacturing concerns include those which prepare packaged fishery products; salted, spiced, smoked, dried, or otherwise cured fishery products; canned fishery products; or fishery byproducts.

Fishermen who manufacture are surveyed to obtain the number of persons so employed and the volume and value of the products prepared.

In collecting statistics of manufacturing firms the agents obtain data on the production for each plant in producing areas of products as marketed by the plant. Such products are usually "final" and in form for consumption; however, the products may be "intermediate" and require further processing before reaching the consumer markets. An outstanding example of an intermediate product is green-salted ground fish which almost invariably is further processed before final marketing. In reviewing the statistics of manufactured products it should be observed that intermediate products are not shown where they are prepared to the final stage in the original plant. An exception to this rule, however, is in the case of the production of mild-cured salmon which on account of its importance is shown in its entirety whether further processed in the producing plant or not. In this connection it should also be stated that several of the byproducts for which statistics are shown may be intermediate and the plants producing the final products are not surveyed by this Bureau. Outstanding among such products are marine-animal oils, scrap, and meal.

Statistics of persons engaged in wholesale and manufacturing establishments are reported in three groups: Proprietors, salaried employees, and wage earners.

Proprietors represent those persons who devote their time to the conduct of the enterprise and receive their compensation in the form of profits. Managers of branch houses are not classified as proprietors.

Salaried employees usually include those persons paid by the week or month while wage earners usually consist of those paid on a per

diem or piece-work basis. This, however, is not true in all cases, since the distinction between these two classes depends primarily on the character of the work done rather than the unit of time employed for calculating rates of pay. In general, office employees are classified as salaried employees. Other employees, including plant workmen, are classed as wage earners. Plant foremen or superintendents are classified as salaried employees unless they are principally engaged in manual labor, in which case they are classified as wage earners. Active officers of corporations are classified as salaried employees. Statistics of wage earners are shown in two forms: The average number employed during the operating season; and the average number employed during the year (the monthly average for the year).

*Transporting trade.*—Statistics are obtained on the number of the crew and number of boats and vessels engaged in transporting fishery products from the fishing grounds to port or from port to port. However, if a craft is engaged in catching fish at any time of the year it is included as a fishing craft rather than as a transporter.

*Publication of data.*—Statistics of employment in the fisheries, craft and gear engaged, catch and value of catch, and certain data on industries related to the fisheries are summarized and published in bulletin form as soon as possible after completion of each survey. Later the figures in more detail are included in the annual reports of the Division.

## LOCAL AND SPECIAL SURVEYS

*Landings at certain important United States ports.*—Statistics of the landings of aquatic products at the principal New England ports (Boston and Gloucester, Mass., and Portland, Maine) are obtained in a similar manner. An agent is permanently stationed at each of these ports. His duties include the obtaining of figures daily on the quantity of fish landed by each fishing vessel, the value of such fish landed, information concerning the date of departure and arrival of the vessel, and he also indicates the grounds from which the fish were taken and gear used in their capture. These data are forwarded to the Bureau, where compilations are made. Products of American fisheries received duty free at Boston and Gloucester, Mass., and Portland, Maine, from the treaty coasts of Newfoundland, Magdalen Islands, and Labrador are included in the landings at these ports; however, they are not included in the catch in sectional fishery surveys of the New England States unless they represent a catch by United States vessels. Statistics of these landings are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Data on the landings at Boston, and Gloucester, Mass., have been collected annually since 1893, and those for Portland, Maine, since June 1915. Some data are available for Boston and Gloucester prior to 1893.

Statistics of the landings of fish at Seattle, Wash., are collected by the Bureau's agent in that city. Landings are classified as those made by American fishing vessels and those received by Seattle wholesale dealers. The landings credited to United States fishing vessels are made by vessels operating distinctly as primary fishing units, usually in the offshore fisheries, while those credited as received by wholesale dealers are usually products of the shore fisheries col-

lected mainly from points in Puget Sound and do not include fish received from Alaska or Canada, or landings made by the halibut fleet. Statistics of these landings at Seattle are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Statistics of the landings by fishing vessels at Seattle have been collected since June 1915 and certain data on products received by Seattle wholesale dealers since December 1915.

Statistics of the fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department in Washington. They are not published in bulletin form, but a summary of the year's activities is published in the annual reports of the Division. Data on products handled at the municipal wharf are available since 1921.

*Atlantic mackerel fishery.*—Statistics on the catch by the Atlantic mackerel fleet are obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Maine, with those obtained by Bureau agents, who in recent years have been stationed at other Atlantic ports where mackerel are landed. These agents obtain data on the volume of mackerel landed in a manner similar to that used to obtain figures on the landings by fishing vessels at the three New England ports. The figures include only the catches made by purse seine and drift gill net craft and are not complete for craft of under 5 net tons' capacity using this type of gear. Statistics of this fishery appear only in the annual reports of this Division, although the landings at the principal New England ports appear in the monthly and annual bulletins published for those ports. Statistics of this fishery are available from 1905 to 1934, inclusive.

*Shad and alewife fisheries.*—Owing to the importance of the Hudson and Potomac Rivers in the production of shad, surveys for statistics of the catch, value of the catch, and operating units are made annually. On the Potomac River similar statistics also are obtained for the alewife fishery. Much of the data required for these surveys are available from the State fishery agencies.

Statistics of the shad and alewife fisheries are not published separately in bulletin form, but a summary of the year's activities is published in the annual reports of the Division.

Statistics of the shad fishery of the Hudson River are available for 1896, 1897, 1898, 1901, 1904, 1910, and from 1915 to 1934, inclusive, while data for the shad fishery of the Potomac River are available for 1896, 1901, 1904, 1909, 1915, and from 1919 to 1934, inclusive. Statistics of the alewife fishery of the Potomac River are available for 1896, 1909, 1915, and from 1919 to 1934, inclusive.

*Pacific halibut fishery.*—Statistics of the Pacific halibut fishery are obtained by the Bureau's agent in Seattle, aided by Bureau representatives in Alaska and the International Fisheries Commission. The fleet classification has been arbitrarily applied by including in the "Washington fleet" all United States and Alaska vessels that land more than half of their catch in that State. All other United States and Alaska vessels of the halibut fleet are included in the "Alaska fleet." Monthly and annual statistical bulletins are available on this fishery, being published along with the statistics of the landings of fishery products at Seattle, Wash., and detailed statistics are published in the annual reports of the Division. Statistics of the landings of halibut at Pacific coast ports have been collected since 1925.

*Canned fishery products and byproducts.*—Beginning in 1921, the Bureau has made annual surveys for statistics of the canned fishery products and byproducts industries of every section. These are begun the first week in January of each year for statistics of the production in the preceding year. The surveys usually occupy 6 to 9 weeks' time. During this period the Bureau obtains by mail, so far as possible, the production of canned fishery products or byproducts from each plant in the United States engaged in this business. Where it is impossible to obtain reports by mail the report is obtained by personal visit by the Bureau's agents. They obtain statistics of the production and value of the production for each commodity. Statistics of the canned fishery products and byproducts produced in Alaska are received on the same statements obtained by the Bureau that include statistics of their general fishery operations.

An annual statistical bulletin is issued on this trade, and detailed statistics of the output are published in the annual reports of the Division. In addition to the data obtained on the output of these products annually since 1921, data also usually were obtained prior to 1921 for the years the various sections were surveyed.

The value shown for canned products constitutes the gross amount received by the packer at the production point, no deductions being made for commission or expenses.

*Packaged-fish trade.*—Complete statistics of the annual production and value of fish packaged in the United States are obtained as a part of the survey for the statistics of the canned fishery products and byproducts industries. These statistics are released in bulletin form annually and detailed statistics are published in the annual reports of the Division. Statistics of the production of packaged fish are available for 1926 and the years from 1928 to 1934, inclusive.

*Cold-storage holdings of fish.*—An arrangement has been made with the Bureau of Agricultural Economics, Department of Agriculture, whereby statistics of the cold-storage holdings of the various species of fish, by sections of the United States, are furnished to this Bureau monthly. Included with statistics of the holdings are statements of the quantity of the various species of fish frozen and also the holdings of certain cured fish. Bulletins showing these statistics are issued monthly as well as annually, and detailed statistics are published in the annual reports of this Division. Statistics of cold-storage holdings of fishery products have been published since 1917 and data on quantities of fish frozen, for the years from 1920 to 1925, inclusive, and from 1928 to 1934, inclusive.

*Sponge market, Tarpon Springs.*—A large proportion of the total output of sponges in Florida is handled through the sponge exchange at Tarpon Springs. In view of this, the Bureau has obtained from a representative of the exchange annual statistics of the quantity and value of the sponges, by variety classification, handled through it annually. Statistics of the quantity of sponges handled through the exchange are not published in bulletin form, but a summary of the year's activities is published in the annual reports of this Division. Statistics of the transactions on the sponge exchange are available for 1913, 1914, and for the years from 1917 to 1934, inclusive.

*Foreign fishery trade.*—Statistics of the foreign fishery trade are obtained from compilations made by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Statistics of all

known fishery products imported or exported have been assembled in one table and published annually in the reports of the Division in recent years. For earlier years they are available in the reports of the Bureau of Foreign and Domestic Commerce, the Bureau of Statistics, the Department of Commerce and Labor, and the Treasury Department.

## PRACTICES AND TERMS

Certain practices and terms of importance used in the compilation of fishery statistics are explained below.

*Days absent.*—In computing "days absent" for vessels landing fares at the various ports, the day of departure and the day of arrival are included; thus, a vessel leaving port on the 8th of the month and returning on the 15th of the month will be shown as being absent 8 days.

*Operating units.*—Operating units as referred to in this document include persons engaged in the fisheries and fishing craft and gear employed.

*Vessel.*—The term "vessel" refers to a craft having a capacity of 5 net tons or more.

*Boat.*—The term "boat" refers to a craft having a capacity of less than 5 net tons.

*Incidental catch.*—The term "incidental catch" refers to the catch of certain species by a type of gear which ordinarily does not capture such species.

*Percentages.*—Percentages are usually shown as whole numbers. Fractions of percents are dropped if less than five-tenths, and the percentage is raised to the next higher integer if the fraction is greater than five-tenths. If the fraction is exactly five-tenths, the integer is raised or lowered to make it an even number.

*Converting.*—Many of the figures shown in the statistical tables published herewith have been reduced to thousands of pounds or dollars. In making these conversions the largest number from which a group of items is computed is raised or lowered to the nearest thousands place. If the number ends in an even 500, the thousands integer is raised or lowered to make it an even number. The individual items are changed to conform to the total thus obtained.

*Confidential data.*—The statistical data collected by the Division are confidential and are not released except by approval of the Washington office. Statistics of production of wholesale and manufacturing firms are published only for commodities or geographical areas where the production of three or more concerns may be grouped. Every effort is made to publish only those figures which will not reveal individual enterprise.

## CONVERSION FACTORS

It is the policy of the Bureau to show the detailed catch figures of all products in pounds for the sake of uniformity and for purposes of comparison. Following such a policy presents certain problems. In the case of fish there is little difficulty since in very rare instances are such products reported in units of measure other than pounds. For shellfish, however, the units of measure may be bushels, sacks, barrels, or thousands of shellfish, gallons of meats, etc. These many units make standardization difficult, but when coupled with the wide varia-

tion in the requirements or definition of some of these units in the various States the problem becomes even more complex.

All bivalve mollusks are reported in pounds of meats in the detailed catch tables presented in this report. In addition, there are included supplementary tables for most of the sections, which give data on the production in bushels. These supplementary tables also give the production of certain other shellfish, such as crabs, in number.

*Oysters.*—Probably the greatest problem in presentation of fishery statistics in uniform units of measure is in the case of oysters. Usually the production of oysters on the Atlantic and Gulf coasts is reported to Bureau agents in bushels; and prior to the data obtained for the year 1930 conversion from bushels to pounds of meats was effected on the basis of a uniform yield of 7 pounds of meats to the bushel. However, recent investigations have shown considerable variation from this figure. There follows a table which gives the results of these studies of the measures used for oysters in the various States and of the average yields per bushel. This table presents the factors that have been used in the oyster statistics given in this report.

*Measures and yields of oysters* [1]

| State | Capacity of State bushel | Variation from United States standard bushel | | Market oysters | |
|---|---|---|---|---|---|
| | | | | Yield per State bushel | Yield per standard bushel |
| | *Cubic inches* | *Cubic inches* | *Percent* | *Pounds of meats* | *Pounds of meats* |
| Massachusetts | 2,150.4 | | | 6.57 | 6.57 |
| Rhode Island | 2,150.4 | | | 6.96 | 6.96 |
| Connecticut | 2,150.4 | | | 6.81 | 6.81 |
| New York | 2,150.4 | | | 7.00 | 7.00 |
| New Jersey | 2,257.3 | +106.9 | +5.0 | 8.70 | 8.29 |
| Delaware | 2,257.3 | +106.9 | +5.0 | 7.88 | 7.50 |
| Maryland | 2,801.5 | +650.1 | +30.2 | 6.24 | 4.79 |
| Virginia | 3,003.4 | +853.0 | +39.7 | 6.32 | 4.53 |
| North Carolina | 2,801.9 | +651.5 | +30.3 | 5.58 | 4.28 |
| South Carolina | 4,071.5 | +1,921.1 | +89.3 | 4.74 | 2.50 |
| Georgia | 2,753.4 | +603.0 | +28.0 | 5.88 | 4.59 |
| Florida | 3,214.1 | +1,063.7 | +49.4 | 3.57 | 2.39 |
| Alabama | 2,826.2 | +675.8 | +31.4 | 3.29 | 2.50 |
| Mississippi | 2,826.2 | +675.8 | +31.4 | 2.22 | 1.69 |
| Louisiana | 2,148.4 | −2.0 | −0.1 | 4.32 | 4.32 |
| Texas | 2,700.0 | +549.6 | +25.6 | 4.41 | 3.51 |

[1] Data for the Chesapeake, and the South Atlantic and Gulf States are for 1934. Other data are for 1933.

*Other mollusks.*—The following table shows the conversion factors for various mollusks, other than oysters, used in this report.

*Average yields of certain mollusks in pounds of meats per bushel* [1]

| State | Clams, hard | | Clams, soft, public | Clams, surf | Clams, razor | Mussels, sea | Periwinkles and cockles | Scallops, bay | Scallops, sea | Conchs |
|---|---|---|---|---|---|---|---|---|---|---|
| | Public | Private | | | | | | | | |
| Maine | 11 | | 15 | | | 12 | 18 | | 6 | |
| Massachusetts | 11 | 11 | 15 | 17 | 32 | 10 | 18 | 6 | 6 | |
| Rhode Island | 11 | 11 | 16 | | | 13 | 18 | 6 | | |
| Connecticut | 10 | | 14 | | | | | 5.75 | 6 | |
| New York | 8 | 8 | 16 | 12 | | 10 | | 5 | 6 | 18 |
| New Jersey | 8.96 | 8.96 | 20 | 12.5 | | 13 | 11.85 | 6 | 6 | 18 |
| Delaware | 10 | 10 | | | | | | | | |
| Maryland | 8 | | | | | | | | | |
| Virginia | 8 | | | | | 13 | | | 6 | |
| North Carolina | 8 | | | | | | | 6 | | |
| South Carolina | 8 | | | | | | | | | |
| Florida | 8 | | | | | | | 5.3 | 6 | 5 |

[1] Data for the Chesapeake, and South Atlantic and Gulf States are for 1934. Other data are for 1933.

*Other conversion factors.*—The principal other conversion factors that have been used in this report are as follows:

| | |
|---|---|
| Alewives | To convert number of fish to weight in pounds, multiply by 0.4. |
| Cod, large, salted | To convert to fresh-gutted weight, multiply by 1.90. |
| Cod, market, salted | To convert to fresh-gutted weight, multiply by 1.94. |
| Cod, scrod, salted | To convert to fresh-gutted weight, multiply by 1.98. |
| Crustaceans: | |
| Crabs, soft (New York, Maryland, and Virginia) | To convert number of crabs to weight in pounds, divide by 4. |
| Crabs, soft (Louisiana) | To convert number of crabs to weight in pounds, divide by 2.53. |
| Crabs, soft (other States) | To convert number of crabs to weight in pounds, divide by 3. |
| Crabs, hard (Georgia) | To convert number of crabs to weight in pounds, divide by 2. |
| Crabs, hard (Florida) | To convert number of crabs to weight in pounds, divide by 1.91. |
| Crabs, hard (Alabama) | To convert number of crabs to weight in pounds, divide by 1.71. |
| Crabs, hard (Mississippi) | To convert number of crabs to weight in pounds, divide by 1.97. |
| Crabs, hard (Louisiana) | To convert number of crabs to weight in pounds, divide by 2.21. |
| Crabs, hard (Texas) | To convert number of crabs to weight in pounds, divide by 2.18. |
| Crabs, hard (other States) | To convert number of crabs to weight in pounds, divide by 3. |
| Crabs, stone | To convert number of crabs to weight in pounds multiply by 1.25. |
| Cusk, salted | To convert to fresh-gutted weight, multiply by 1.90. |
| Haddock, large, salted | To convert to fresh-gutted weight, multiply by 2.06. |
| Haddock, scrod, salted | To convert to fresh-gutted weight, multiply by 2.10. |
| Hake, large, salted | To convert to fresh-gutted weight, multiply by 1.90. |
| Hake, small, salted | To convert to fresh-gutted weight, multiply by 1.98. |
| Halibut, salted | To convert to fresh-gutted weight, multiply by 2. |
| Herring, salted | To convert to round weight, multiply by 1.50. |
| Mackerel, salted | To convert to round weight, multiply by 1.35. |
| Menhaden | To convert number of fish to weight in pounds, multiply by 0.6. |
| Oil (east coast) | To convert gallons to pounds, multiply by 7.74. |
| Oil (west coast) | To convert gallons to pounds, multiply by 7.5. |
| Pollock, salted | To convert to fresh-gutted weight, multiply by 1.90. |
| Sponges, dried (Florida): | |
| Large wool | To convert number of bunches to weight in pounds, multiply by 3.5. |
| Medium wool | To convert number of bunches to weight in pounds, multiply by 1.75. |
| Small wool | To convert number of bunches to weight in pounds, multiply by 1. |
| Wool rags | To convert number of bunches to weight in pounds, multiply by 2.25. |
| Grass | To convert number of bunches to weight in pounds, multiply by 1. |
| Wire | To convert number of bunches to weight in pounds, multiply by 1.5. |
| Yellow | To convert number of bunches to weight in pounds, multiply by 1.25. |

## COMMON AND SCIENTIFIC NAMES OF FISHERY PRODUCTS

In order to prevent misunderstanding in the use of common names employed in the tables and discussions, the following list of common and scientific names is given:

*Common and scientific names of the commercial fishery products caught in the United States and Alaska*

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Albacore | Longfin tuna | *Germo alalunga* (Pacific coast). |
| Alewives | Branch herring, wall-eyed or big-eyed herring | *Pomolobus pseudoharengus.* |
| | Blueback, glut herring | *Pomolobus aestivalis.* |
| Amberjack | | Seriola species. |
| Anchovies | | *Engraulis mordax.* |
| | | *Anchoviella delicatissima.* |
| | | *Anchoviella compressa.* |
| Anglefish | | *Pomacanthus arcuatus.* |
| | | *Angelichtys isabelita.* |
| Barracuda | | *Sphyraena argentea* (Pacific coast). |
| | | *Sphyraena barracuda* (Atlantic coast). |
| Black bass | Smallmouth bass | *Micropterus dolomieu.* |
| | Largemouth bass | *Micropterus salmoides.* |
| Bluefish | Tailor | *Pomatomus saltatrix.* |
| Blue pike | Pike perch, blue pickerel (Canada). | *Stizostedion glaucum.* |
| Blue runner or hard-tail. | Runner | *Caranx crysos.* |
| Bonito | | *Sarda sarda.* |
| | | *Sarda chiliensis.* |
| Bowfin | | *Amia calva.* |
| Buffalofish | | Ictiobus species. |
| Bullhead | | Ameiurus species. |
| Butterfish | Dollarfish | *Poronotus triacanthus.* |
| Burbot | Lawyer, ling | *Lota maculosa.* |
| Cabio | Coalfish, crab eater, cobia | *Rachycentron canadus.* |
| Cabrilla | Rock bass | *Epinephelus analogus* (Pacific coast). |
| Carp | German carp | *Cyprinus carpio.* |
| Catfish | | Siluridae species. |
| Cero | | *Scomberomorus regalis.* |
| Chubs | Tullibee in Canada; longjaw, bluefin, blackfin in United States. | All *Leucichthys* except *artedi* (in Great Lakes). |
| Cigarfish | Scad | Decapterus species. |
| Cisco | Herring in Canada | *Leucichthys artedi* (Lake Erie only). |
| Cod | Codfish | *Gadus macrocephalus* (Pacific coast). |
| | | *Gadus callarias* (Atlantic coast). |
| Corbina | Orange mouth corbina | *Cynoscion xanthulum.* |
| Crappie | White crappie | *Pomoxis annularis.* |
| | Black crappie, strawberry bass, calico bass. | *Pomoxis sparoides.* |
| Crevalle | | *Caranx hippos.* |
| Croaker | Crocus, hardhead | *Micropogon undulatus.* |
| Cunner | Chogset, blue perch, bergall. | *Tautogolabrus adspersus.* |

*Common and scientific names of the commercial fishery products caught in the United States and Alaska*—Continued

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Cusk | | *Brosmius brosme.* |
| Cutlassfish | Ribbonfish | *Trichiurus lepturus.* |
| Dolly Varden trout | Salmon trout, bull trout | *Salvelinus parkei.* |
| Dolphin | | *Coryphaena hippurus.* |
| Drum: | | |
| Black | | *Pogonias cromis.* |
| Red | Channel bass, redfish, spotted bass. | *Sciaenops ocellatus.* |
| Eels: | | |
| Common | | *Anguilla rostrata.* |
| Conger | | *Leptocephalus conger.* Gymnothorax species. |
| Flounders | Dabs, blackbacks, lemon sole, winter flounder, summer flounder. | Pleuronectidae species. |
| | Halibut, "California" | *Paralichthys californicus.* |
| | Sole | *Psettichthys melanostictus* (Pacific coast). |
| Flyingfish | | *Cypsilurus californicus.* |
| Frigate mackerel | "Boo Hoo" | *Auxis thazard.* |
| Garfish | | (See sea gar.) |
| Gizzard shad | Nanny shad, mud shad | *Dorosoma cepedianum.* |
| Goldeye | | Hiodon species. |
| Goldfish | Sand perch | *Carassius auratus.* |
| Goosefish | | *Lophius piscatorius.* |
| Grayfish | Dogfish | *Squalus sucklii* (Pacific coast). |
| | Spiny dog | *Squalus acanthias.* |
| | Smooth dog | *Mustelus mustelus.* |
| Groupers | "Sea bass" | Epinephelus species. Mycteroperca species. |
| Grunts | Margatefish, sailors choice (Key West). | Haemulon species. |
| Haddock | | *Melanogrammus aeglefinus.* |
| Hagfish | Slimefish | *Myxine glutinosa.* |
| Hake | Squirrel hake, Boston hake, ling, black hake, mud hake. | Urophycis species (Atlantic coast). |
| | Merluccio | *Merluccius productus* (Pacific coast). |
| Halibut | | *Hippoglossus hippoglossus.* |
| Hardhead | | *Orthodon microlepidotus* (Pacific coast). |
| Harvestfish | Starfish, pappyfish; butterfish (N. C.). | *Peprilus alepidotus.* |
| Herring: | | |
| Lake | Herring | *Leucichthys artedi* (Great Lakes, except Erie). |
| Round | | *Etrumeus sadina.* |
| Sea | | *Clupea harengus* (Atlantic coast). *Clupea pallasii* (Pacific coast). |
| Herring smelt | Sea smelt | *Argentina silus.* |
| Hickory shad | Tailor shad | *Pomolobus mediocris.* |
| Hogfish | Capitaine, perro perro | *Lachnolaimus maximus* (Florida). |
| Horse mackerel | | *Trachurus symmetricus* (Pacific coast). |

*Common and scientific names of the commercial fishery products caught in the United States and Alaska*—Continued

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Jewfish | | *Promicrops itaiara.* |
| Kingfish | | *Scomberomorus cavalla* (Atlantic coast). |
| | Little roncador, croaker | *Genyonemus lineatus* (California). |
| King whiting | Northern whiting, kingfish, seaming. | Menticirrhus species. |
| Ladyfish | Bonefish | *Albula vulpes.* |
| Lake trout | | *Cristivomer namaycush.* |
| Launce | Sand eel, lant, sand launce. | *Ammodytes americanus.* |
| "Lingcod" | Cultus cod, blue cod, buffalo cod, ling. | *Ophiodon elongatus.* |
| Mackerel | | *Scomber scombrus* (Atlantic coast). *Scomber diego* (Pacific coast). |
| Marlin | Spearfish | *Tetrapturus mitsukurii* (Pacific coast). |
| Menhaden | Mossbunker, pogy | *Brevoortia tyrannus.* |
| Minnows | | Cyprinidae species. |
| Mojarro | | Eucinostomus species. |
| Mooneye | Toothed herring | Hiodon species. |
| Moonfish | | *Vomer setipinnis.* *Selene vomer.* |
| Mullet | Jumping mullet | *Mugil* species. |
| Mummichog | Mayfish, killifish | *Fundulus* species. |
| Muttonfish | | *Lutianus analis.* |
| Paddlefish | Spoonbill cat | *Polyodon spathula.* |
| Parrotfish | | Scaridae species. |
| Perch (California) | | (See surf fishes.) |
| Permit | Great pompano | *Trachinotus goodei.* |
| Pigfish | Hogfish (N. C.) | *Orthopristis chrysopterus.* |
| Pike or pickerel | Great Lakes pike | *Esox reticulatus.* *Esox lucius.* |
| Pilchard | Sardine | *Sardina caerulea.* |
| Pilotfish | | *Naucrates ductor.* *Seriole zonata.* |
| Pinfish | Bream, salt-water bream | *Lagodon rhomboides.* |
| Pollock | | *Pollachius virens.* |
| Pompano | | *Trachinotus* species (Atlantic coast). *Palometa simillima* (Pacific coast). |
| Porgies | Porgee | *Calamus* species. |
| Porkfish | Sisi | *Anisotremus virginicus.* |
| Quillback | Spearfish or skimfish | *Carpiodes* species. |
| Roach | Shiner | *Notemigonus crysoleucas.* |
| Rock bass | Redeye, goggle-eye | *Ambloplites rupestris* (Mississippi River to Atlantic seaboard). |
| | Groupers | *Paralabrax nebulifer* (Pacific coast). |
| Rockfishes | Rock cod | *Sebastodes* species (Pacific coast). |
| Rosefish | | *Sebastes marinus.* |
| Rudderfish | Blue bass, greenfish | *Girella nigricans* (Pacific coast). |
| | Halfmoon | *Medialuna californiensis* (Pacific coast). |

*Common and scientific names of the commercial fishery products caught in the United States and Alaska*—Continued

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Sablefish | Black cod | *Anaplopoma fimbria.* |
| Salmon: | | |
| Atlantic | | *Salmo salar* (Atlantic coast). |
| Pacific: | | |
| Blueback, red, or sockeye. | | *Oncorhynchus nerka.* |
| Chinook or king. | Tyee, Columbia, Sacramento, spring. | *Oncorhynchus tschawytscha.* |
| Chum or keta. | Dog salmon | *Oncorhynchus keta.* |
| Humpback or pink. | | *Oncorhynchus gorbuscha.* |
| Silver or coho | | *Oncorhynchus kisutch.* |
| Steelhead | See steelhead trout. | |
| Sauger | Sand pike | *Stizostedion canadense.* |
| Sawfish | | *Pristis pectinatus.* |
| Sculpin | | Cottidae species. |
| Scup | Paugy or porgy, fair maid. | *Stenotomus* species. |
| Sea bass | Black jewfish or black sea bass. | *Stereolepis gigas* (Pacific coast). |
| | Black sea bass | *Centropristes striatus* (Atlantic coast). |
| | White sea bass | *Cynoscion nobilis* (Pacific coast). |
| Sea catfish | Gafftopsail | *Bagre marina.* |
| Sea gar | Needlefish, billfish, houndfish. | *Tylosurus* species. |
| Sea robin | | *Prionotus* species. |
| Shad | American shad | *Alosa sapidissima.* |
| Sharks | | *Carcharodon* species: Mustelus species; *Carcharhinus* species; *Sphyrna* species. |
| Sheepshead | | *Archosargus probatocephalus* (Atlantic coast). |
| | Drum, fresh-water | *Aplodinotus grunniens* (fresh water). |
| | Redfish, flat head | *Pimelometopon pulcher* (Pacific coast). |
| Silver perch | Sand perch | *Bairdiella chrysura.* |
| Silversides | Spearing | *Menidia* species. |
| Skates | | *Raja* species. |
| Skipper | Billfish | *Scomberesox saurus.* |
| Smelts | | *Osmerus mordax* (Atlantic coast). |
| | | Argentinidae species (Pacific coast). |
| | Eulachon | *Thaleichthys pacificus.* |
| Snapper: | | |
| Mangrove | Gray snapper | *Lutianus griseus.* |
| Red | | *Lutianus blackfordii.* |
| Snook | Robalo, sergeantfish | *Centropomus undecimalis.* |
| Spadefish | Porgy (N. C.) | *Chætodipterus faber.* |
| Spanish mackerel | | *Scomberomorus maculatus.* |
| Splittail | | *Pogonichthys macrolepidotus.* |
| Spot | Lafayette, goody | *Leiostomus xanthurus.* |
| Squawfish | Sacramento pike | *Ptychocheilus grandis.* |

*Common and scientific names of the commercial fishery products caught in the United States and Alaska*—Continued

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Squeteague: | | |
| Gray | Gray trout, weakfish, trout. | *Cynoscion regalis.* |
| Spotted | Spotted weakfish, spotted trout. | *Cynoscion nebulosus.* |
| White | Sand trout | *Cynoscion aremarius.* |
| Squirrelfish | | *Diplectrum formosum.* |
| Squirrel hake | See hake. | |
| Steelhead trout | Salmon trout | *Salmo gairdneri.* |
| Striped bass | Rockfish, rock | *Roccus lineatus.* |
| Sturgeon | | *Acipenser* species. |
| Sturgeon, shovelnose | | *Scaphirhynchus platorynchus.* |
| Sucker | Fresh-water mullet | Catostomídae species. |
| Sunfish | | *Lepomis* species.<br>Centrarchidae species. |
| Surf fishes | | Embiotocidae species. |
| Swellfish | Puffer, swell toad, balloonfish, globefish. | *Spheroides maculatus.* |
| Swordfish | | *Xiphias gladius.* |
| Tai | | *Calumus brachysomus.* |
| Tautog | Blackfish, oysterfish | *Tautoga onitis.* |
| Tenpounder | Elops | *Elops saurus.* |
| Thimble-eyed mackerel. | Bullseye | *Scomber colias.* |
| Tilefish | | *Lopholatilus chamæleonticeps.* |
| Tomcod | | *Microgadus tomcod* (Atlantic coast).<br>*Microgadus proximus* (Pacific coast). |
| Tripletail | | *Lobotes surinamensis.* |
| Tullibee | | (See chubs.) |
| Tuna and tunalike fishes: | | |
| Albacore | Longfin tuna | *Germo alalunga.* |
| Bluefin | Tuna, leaping tuna (Pacific coast).<br>"Horse mackerel" (Atlantic coast). | *Thunnus saliens.*<br>*Thunnus secundodorsalis.* |
| Bonito | | *Sarda sarda* (Atlantic coast).<br>*Sarda chiliensis* (Pacific coast). |
| Skipjack | Striped tuna | *Euthynnus pelayms.* |
| Yellowfin | | *Neothunnus macropterus.* |
| Turbot | Greenland halibut<br>American turbot | *Reinhardtius hippoglossoides* (off New England).<br>*Balistes carolinensis* (off Florida). |
| White bass | White lake bass | *Roccus chrysops.* |
| Whitebait | Small fry of any fish. | |
| Whitefish: | | |
| Common | | *Coregonus clupeiformis* (Great Lakes).<br>*Caulolatilus princeps* (Pacific coast). |
| Menominee | | *Prosopium quadrilaterale* |
| White perch | | *Morone americana* (Atlantic coast). |
| Whiting | Silver hake | *Merluccius bilinearis.* |
| Wolffish | | *Anarhichas lupus.* |
| Yellow perch | | *Perca flavescens.* |

*Common and scientific names of the commercial fishery products caught in the United States and Alaska*—Continued

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Yellow pike | Wall-eyed pike, pike perch, dore. | *Stizostedion vitreum.* |
| Yellowtail | | *Ocyurus chrysurus* (Atlantic coast).<br>*Seriola dorsalis* (Pacific coast). |
| Crabs: | | |
| Hard | Hard-shell crab, blue crab | *Callinectes sapidus.* |
| | Dungeness crab | *Cancer magister* (Pacific coast). |
| | Rock crab, hard crab | *Cancer irroratus* (Atlantic coast). |
| Soft | Soft-shelled crab, blue crab. | *Callinectes sapidus.* |
| King | Horseshoe crab | *Limulus* (Atlantic coast). |
| Stone | | *Menippi mercenaria.* |
| Crawfish: | | |
| Fresh-water | Crayfish | Cambarus species (Atlantic coast).<br>Astacus species (Pacific coast). |
| Sea | Rock lobster, crayfish | *Panulirus argus* (Atlantic coast).<br>*Panulirus interruptus* (Pacific coast). |
| Lobsters: | | |
| Common | | *Homarus americanus* (Atlantic coast). |
| Spiny | (See sea crawfish.) | |
| Shrimp | | *Peneus setiferus.*<br>*Peneus brasiliensis* (Atlantic and Gulf coasts).<br>Pandalus species (Pacific coast).<br>Pandalopsis species (Pacific coast).<br>Crangon species (Pacific coast). |
| Abalone | | Halotis species. |
| Clams: | | |
| Cockle | | *Cardium corbis* (Pacific coast). |
| Hard | Butter | *Saxidomus nuttall.* |
| | Round clam, cherrystone, quahog, little neck. | *Tivela stultorum* (Pacific coast).<br>*Venus mercenaria* (Atlantic coast).<br>*Venus mortoni* (Florida coast). |
| Pismo | | *Tivela stultorum* (Pacific coast). |
| Razor | | Enis species (Atlantic coast).<br>*Siliqua patula* (Pacific coast). |
| Soft | Softshell clam, sand clam, nannynose, maninose. | Mya arenaria. |
| Surf | Skimmer | *Mactra solidissimo.* |
| Cockles | Moonshell | *Natica heros* (Atlantic coast). |
| Conchs | | Strombus species.<br>Busycon species. |

*Common and scientific names of the commerical fishery products caught in the United States and Alaska*—Continued

| Common name as shown in Bureau reports | Other common names | Scientific names |
|---|---|---|
| Coquina | Pompano shells | *Donax variabilis.* |
| Mussels: | | |
| Sea | | *Mytilus californianus* (Pacific coast). *Mytilus edulis.* |
| Fresh water | | Quadrula species. Lampsilis species. Unio species. Symphynota species. |
| Octopus | | *Octopus punctatus* (Pacific coast). |
| Oysters: | | |
| Eastern | | *Ostrea virginica* |
| Western | Olympia | *Ostrea lurida* (Pacific coast). |
| Japanese (introduced). | Pacific | *Ostrea gigas.* |
| Periwinkles | | Littorina species. |
| Scallops: | | |
| Bay | | *Pecten irradians* (Atlantic coast). *Pecten aequisulcatus* (Pacific coast). |
| Sea | | *Pecten magellanicus.* |
| Squid | | *Loligo opalescens* (Pacific coast). *Loligo pealei* (Atlantic coast). |
| Sea urchins | | Echinoidea. |
| Terrapin | Diamond-back terrapin | Malaclemmys species. |
| Turtles: | | |
| Green | | *Chelonia mydas.* |
| Loggerhead | | *Thalassochelys caretta.* |
| Hawksbill | | *Chelonia inbricata.* |
| Snapping | Hard shell, alligator turtle | *Chelydra serpentina.* *Macrochalys lacertina.* |
| Soft shell | | Trionyx species. |
| Frogs | | Rana species. |
| Irish moss | | *Chrondrus crispus.* |
| Kelp | | Macrocystis species; Nereocystis species; Pelagophycus species; Alaria species. |
| Sponges: | | |
| Glove | | *Spongia graminea* (Hyatt) *Euspongia officianalis* (L.). |
| Grass | | *Hippospongia equina cerebriformis.* |
| Sheepswool | | *Hippospongia canaliculata gossypina.* |
| Yellow | | *Hippospongia equina elastica.* |
| Trepang | Sea cucumber | *Cucumaris frondosa; Thyone briareus.* |

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# PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1936 [1]

By Glen C. Leach, *Chief*, and M. C. James, *Assistant Chief, Division of Fish Culture*

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## INTRODUCTION

The production of fish and eggs at Federal hatcheries exceeded any previous year since their inception. There appear elsewhere tabulations and summaries showing the details of this production. The total output amounted to 8,171,000,000 in comparison with 5,071,000,000 of the previous year. It is essential to review these separate statements in order to acquire a clear conception of the exact nature of such a diverse activity, ranging from the planting of fertilized cod eggs on the inshore New England banks to stocking 1-acre cattle tanks with pan fish.

Developments of the past several years have had an interesting bearing upon a matter which is occasionally the subject of critical comment. This is the phase of the Bureau's policy which permits the allocation of fish to so-called private waters, meaning streams or ponds to which the entire public does not have free or unlimited access. The Bureau's policy does not contemplate furnishing fish to exclusive angling clubs or to projects which may be directly commercialized.

[1] Administrative Report No. 25, Appendix III to the Report of the U. S. Commissioner of Fisheries for 1936. Approved for publication Jan. 5, 1937.

It does, however, involve the stocking of waters where private riparian rights may be exercised to exclude the general public. This policy has been based upon the knowledge that the overflow from such private waters will go to stock public streams and the private waters frequently serve as more or less well protected nursery areas. Furthermore, the land owner and his friends, having satisfactory fishing in their own waters, are not frequenting the heavily fished public streams.

Further justification for this policy has been observed in the widespread construction of small reservoirs and ponds, particularly through drought areas, in the last several years. Many of these are strictly private and need not be opened to public fishing. It would be an extreme attitude, however, to hold that these hundreds or thousands of square miles of new waters should go unstocked and fishless because the land owners do not make them accessible to the entire public. At a time when public fishing waters are actually congested with anglers, any step which will relieve some of this pressure is in the interest of conservation. It is, therefore, felt fortunate that the Bureau is empowered to provide fish for these new lakes, pools, and reservoirs, whether they be constructed under public or private auspices.

There has been no general modification of the organization or procedure in the conduct of the Federal hatchery system during the past year. Greater attention has been given to an effort to follow through right up to the actual disposition of the fish in the lakes and streams. A hatchery fish improperly planted or placed in suitable waters is an unfinished product and the effort and money expended previously will have been wasted. To the sportsmen in particular, who have cooperated so well, the Bureau is indebted for material aid in developing a more rational system of stocking.

## SPECIES PROPAGATED

The list of species handled at the Federal hatchery constitutes a cross section of the most important food and game fishes of the interior and coastal waters of the United States. The kinds handled number the same as during the previous year, namely 43 separate species. There was one change in that the white perch were not propagated during the year but were replaced by a resumption of the hatching of lake herring on Lake Ontario.

It should hardly be necessary to state that of the species listed below very few are available for general distribution throughout the country, and the planting of the various forms is largely confined to the particular areas in which they are indigenous.

CATFISHES (SILURIDAE):
- Catfish (*Leptops olivaris*).
- Spotted channel catfish (*Ictalurus punctatus*).
- Horned pout (*Ameiurus nebulosus*).

CARP (CYPRINIDAE):
- Common carp (*Cyprinus carpio*).

BUFFALOFISH (CATOSTOMIDAE):
- Common buffalo (*Ictiobus sp.*).

SHAD and HERRING (CLUPEIDAE):
- Shad (*Alosa sapidissima*).

SALMONS, TROUTS, and WHITEFISHES (SALMONIDAE):
- Common whitefish (*Coregonus clupeaformis*).
- Lake herring, cisco (*Leucicthys sp.*).
- Chinook, king or quinnat salmon (*Oncorhynchus tschawytscha*).
- Chum salmon (*Oncorhynchus keta*).

SALMONS, TROUTS, AND WHITEFISHES—Continued.
Coho salmon, silver salmon (*Oncorhynchus kisutch*).
Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
Steelhead trout (*Salmo gairdneri*).
Atlantic salmon (*Salmo salar*).
Landlocked salmon (*Salmo sebago*).
Rainbow trout (*Salmo shasta*).
Black-spotted trout, redthroat trout (*Salmo lewisi*).
Brown or Loch Leven trout (*Salmo fario var.*).
Lake trout, Mackinaw trout (*Cristivomer namaycush*).
Brook trout (*Salvelinus fontinalis*).
GRAYLING (THYMALLIDAE):
Montana grayling (*Thymallus montanus*).
PIKES (ESOCIDAE):
Pike and pickerel (*Esox sp.*).
SUNFISHES (CENTRARCHIDAE):
Crappie (*Pomoxis annularis* and *P. sparoides*).
Largemouth black bass (*Micropterus salmoides*).
Smallmouth black bass (*Micropterus dolomieu*).
Rock bass (*Ambloplites rupestris*).
Warmouth bass, goggle-eye (*Chaenobryttus gulosus*).
Bluegill sunfish (*Lepomis incisor*).
Green sunfish (*Lepomis cyanellus*).
Redbreasted bream (*Lepomis auritus*).
Red-eared sunfish (*Lepomis heros*).
Common sunfish (*Lepomis gibbosus*).
Rio Grande perch (*Herichthys cyanoguttatus*).
PERCHES (PERCIDAE):
Pike perch (*Stizostedion vitreum*).
Yellow perch, ringed perch (*Perca flavescens*).
WHITE BASSES (SERRANIDAE):
White bass (*Roccus chrysops*).
DRUMS (SCIAENIDAE):
Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).
CODS (GADIDAE):
Cod (*Gadus callarias*).
Haddock (*Melanogrammus aeglefinus*).
Pollock (*Pollachius virens*).
FLOUNDERS (PLEURONECTIDAE):
Winter flounder, American flatfish.
MACKEREL (SCOMBRIDAE):
Common mackerel (*Scomber scombrus*).

*Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1936*

| Species | Eggs | Fry | Fingerlings | Total |
|---|---|---|---|---|
| Catfish | | | 6, 673, 000 | 6, 673, 000 |
| Buffalofish | 142, 337, 000 | | 1, 218, 255 | 143, 555, 255 |
| Carp | 60, 500, 000 | | 3, 277, 600 | 63, 777, 600 |
| Shad | | 12, 150, 000 | | 12, 150, 000 |
| Whitefish | | 38, 080, 000 | | 38, 080, 000 |
| Lake herring | 400, 000 | 2, 740, 000 | | 3, 140, 000 |
| Chinook salmon | | 21, 240 | 53, 607, 860 | 53, 629, 100 |
| Chum salmon | | 14, 139, 000 | 9, 070 | 14, 148, 070 |
| Silver salmon | 25, 000 | 344, 580 | 4, 990, 740 | 5, 360, 320 |
| Sockeye salmon | | 11, 038, 000 | 6, 577, 500 | 17, 615, 500 |
| Steelhead trout | 600, 000 | | 809, 000 | 1, 409, 000 |
| Atlantic salmon | 1, 000, 000 | | 560, 000 | 1, 560, 000 |
| Landlocked salmon | | 67, 500 | 709, 870 | 777, 370 |
| Rainbow trout | 2, 758, 000 | | 12, 136, 400 | 14, 894, 400 |
| Blackspotted trout | 10, 227, 000 | | 12, 003, 310 | 22, 230, 310 |
| Loch Leven trout | 7, 867, 000 | 1, 105, 000 | 4, 576, 360 | 13, 548, 360 |
| Lake trout | 80, 600 | 713, 460 | 113, 575 | 907, 635 |
| Brook trout | 4, 518, 000 | 836, 000 | 12, 938, 650 | 18, 292, 650 |
| Grayling | 350, 000 | 4, 897, 500 | 272, 700 | 5, 520, 200 |
| Pike and pickerel | | | 775, 150 | 775, 150 |
| Crappie | | | 16, 188, 250 | 16, 188, 250 |
| Black bass, largemouth | | 622, 500 | 3, 641, 160 | 4, 263, 660 |
| Black bass, smallmouth | | 1, 255, 000 | 270, 100 | 1, 525, 100 |
| Rock bass | | | 121, 680 | 121, 680 |

*Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1936*—Continued

| Species | Eggs | Fry | Fingerlings | Total |
|---|---|---|---|---|
| Warmouth bass | | | 53, 160 | 53, 160 |
| Sunfish | | | 17, 504, 300 | 17, 504, 300 |
| Pike perch | 504, 965, 000 | 9, 670, 000 | | 514, 635, 000 |
| Yellow perch | 11, 605, 000 | 307, 958, 000 | 147, 000 | 319, 710, 000 |
| Freshwater drum | | | 3, 400 | 3, 400 |
| White bass | | | 17, 000 | 17, 000 |
| Miscellaneous fishes | | | 1, 416, 400 | 1, 416, 400 |
| Mackerel | | 1, 334, 000 | | 1, 334, 000 |
| Cod | 3, 416, 733, 000 | 261, 662, 000 | | 3, 678, 395, 000 |
| Haddock | 419, 976, 000 | 9, 588, 000 | | 429, 564, 000 |
| Flatfish (flounder) | 43, 854, 000 | 1, 435, 283, 000 | | 1, 479, 137, 000 |
| Pollock | 793, 831, 000 | 475, 457, 700 | | 1, 269, 288, 700 |
| Total | 5, 421, 626, 600 | 2, 588, 962, 480 | 160, 611, 490 | 8, 171, 200, 570 |

## PRODUCTION

A jump of approximately 60 percent in the curve of hatchery production during one year must naturally be attributed to some specific circumstances or condition aside from increased efficiency. This increase for the fiscal year 1936 is in a large degree traceable to an expansion of the propagation of marine fishes of the New England coast. Four varieties, the cod, haddock, pollock and flatfish were handled in an aggregate exceeding 6,500,000,000, in comparison with 3,500,000,000 of the same species for the previous year. This work was augmented in response to the expressed desire of Congress, and also due to the fact that it is a form of by-product recovery which can be carried on at relatively small cost.

The planting of over 3,500,000,000 fertilized eggs of these species is accomplished by no more complicated procedure than the placing of spawn takers on commercial fishing vessels operating in inshore New England waters. The eggs returned to the spawning grounds by this means would otherwise be a total loss.

Far greater interest will lie in a study of the output of game fish included in the above totals. The 118,680,000 game and pan fish is approximately 4,000,000 more than were produced last year and is 1.5 percent of the total output. The cost of producing this 1.5 percent, however, is approximately the same as the expense of propagating the remaining 98.5 percent. This is largely due to the fact that the majority of game fish are distributed as fingerlings or larger. One hundred and sixty million fingerlings, 27,000,000 more than last year, went to replenish our fishing waters. The significance of this is that this number of fish will have a much greater chance of surviving the hazards of predators and adverse natural conditions than would a greatly increased number of fry.

Conditions will not permit the Bureau to distribute its game fish at the legal catchable size, as is done by a number of the States, but the trend is constantly toward that end. Since it requires from 3 to 5 pounds of fish food, plus constant and assiduous care for a period of a year or more to produce 1 pound of trout, it will be seen that there are valid reasons why the foregoing objective is not realized 100 percent.

## CONSTRUCTION ACTIVITIES

The physical condition of the 80 odd properties used for fish cultural work has an important bearing upon the production of fish. The year's activities involved a normal amount of upkeep and main-

tenance work as well as new construction to augment production facilities. New construction during the year has been mainly confined to three Works Progress Administration projects involving the erection of new fish cultural stations at Uvalde, Tex., Santa Rosa, N. Mex., and Smokemont, N. C., in the Great Smoky Mountain National Park. Active construction was initiated in November and the New Mexico project completed by the close of the fiscal year. In North Carolina the new hatchery was placed on a producing basis but was not fully completed. In Texas the work progressed favorably but considerable remained to be done at the end of the year. In addition the Bureau supervised the construction of hatchery facilities by certain other agencies, the details of which appear elsewhere in this report.

Beyond this, local W. P. A. agencies sponsored projects comprising the enlargement and improvement of several of the Bureau's hatcheries, including those at Rochester, Ind., Natchitoches, La., Lake Mills, Wis., Hagerman, Idaho, and the Upper Mississippi Wild Life and Fish Refuge. Development work also continued at the York Pond, N. H., brook trout station, labor and materials being secured from the Emergency Conservation organization and the W. P. A. C. C. C. workers also effected minor improvements at the Lamar, Pa., hatchery and small details of enrollees were used at several of the western hatcheries. No major items of improvement were effected from the Bureau's regular operating appropriations since it was necessary to devote these funds to the production of fish.

There was placed in operation a new hatchery at Harrison Lake, Va., 26 miles southeast of Richmond. The major portion of the construction on this project had been carried on during the previous fiscal year.

## COOPERATION WITH OTHER CONSERVATION AGENCIES

An attempt to show graphically the interrelationship of the Federal hatchery system with other agencies concerned with the conservation of fish life would present a most complicated structure. There are multitudes of contacts throughout the country whereby the propagation and distribution of fish can be handled virtually as a joint enterprise between the Federal Government and the States. In some cases these are based upon specifically formulated agreements, as in the instance of the United States Forest Service and the States of New Hampshire and Vermont. In others they are merely an operating procedure resulting from informal understandings worked out in the field. As an instance of the latter, reference can be made to work in the Rocky Mountain and Pacific coast territory, where the collection of eggs from wild trout is supported by several of the States, who participate in a division of the resulting take. Elsewhere the Bureau's hatcheries are being used to rear game fish and the States contribute to the purchase of fish food.

Another form of valuable coordination lies in the distribution of the Federal hatchery output by the State conservation departments, as is done in Indiana, Georgia, Virginia, and a number of other States. Where Federal and State hatcheries are in juxtaposition it has been possible to concentrate the work in one or the other, or so to divide it as to eliminate any possibility of duplication.

Mention must also be made of the now general practice of submitting Federal fish applications to the State fishery authorities for their

review and approval before deliveries are made. This accomplishes two purposes; first, it prevents the planting of species which might be inimical to whatever stocking policy the State may have developed; second, it makes possible the utilization of the available supply of fish, both State and Federal, to cover the greatest possible territory, and prevents the overstocking of certain waters while others lack needed attention.

So important is the maintenance of working contact with the States that the Division has assigned an employee on full time to act as liaison agent and to work out and maintain these cooperative relationships on a smooth working basis.

As previously, the U. S. Forest Service and the National Park Service have been important beneficiaries of the Bureau's fish cultural work. Probably the most important single phase of the propagation of game fish is the stocking of the public domain principally under the jurisdiction of the above agencies. The other Bureaus and Departments having control of land areas, as for example the Indian Service and the Reclamation Service, must likewise largely depend upon the Federal hatcheries to maintain a supply of fish in the water areas which they administer.

It is most interesting to point out that the newer Governmental agencies are likewise entering the picture under similar conditions. Both the Resettlement Administration and the Tennessee Valley Authority constructed fish hatcheries, which were turned over to the Bureau at the close of the fiscal year for future operation. The former agency developed an excellent hatchery at Hoffman, N. C., as part of a demonstration of land utilization, while the T. V. A. took the first step toward the maintenance of fishing in Norris Lake by constructing a warm-water hatchery below Norris Dam. Tentative plans for further development along this line are in mind.

It is felt that the propagation and distribution of fish, as well as other matters directly related to the administration of fisheries upon Government owned lands, should properly be a responsibility of this Bureau as the agency having the organization, facilities, and the knowledge required.

The maintenance of the closest possible contact with sportsmen's organizations of a semi-public character has not been overlooked. The system of fish nurseries or rearing ponds inaugurated a number of years ago has been continued but no intensive drive is being made to expand this work. Most of the States are now in a position to work more closely with the sportsmen's clubs in their territory in prosecuting such an activity. However, where conditions permit the Bureau has placed its technical information at the disposal of such organizations, this being exemplified in a general program for the establishment of local fish rearing units in the Finger Lakes region in New York. The sportsmen's clubs enlisted the services of the Bureau in laying out a general program for the establishment of the nursery and thereupon presented the matter to the county authorities with the request that they act as sponsors in submitting a W. P. A. project for the construction of the required facilities. While this project had not been brought to fruition at the close of the year, progress was being made in one of the most ambitious programs of this nature yet undertaken.

The Division further feels that it can be of great service to the sportsmen in supplying the technical information, showing them what they

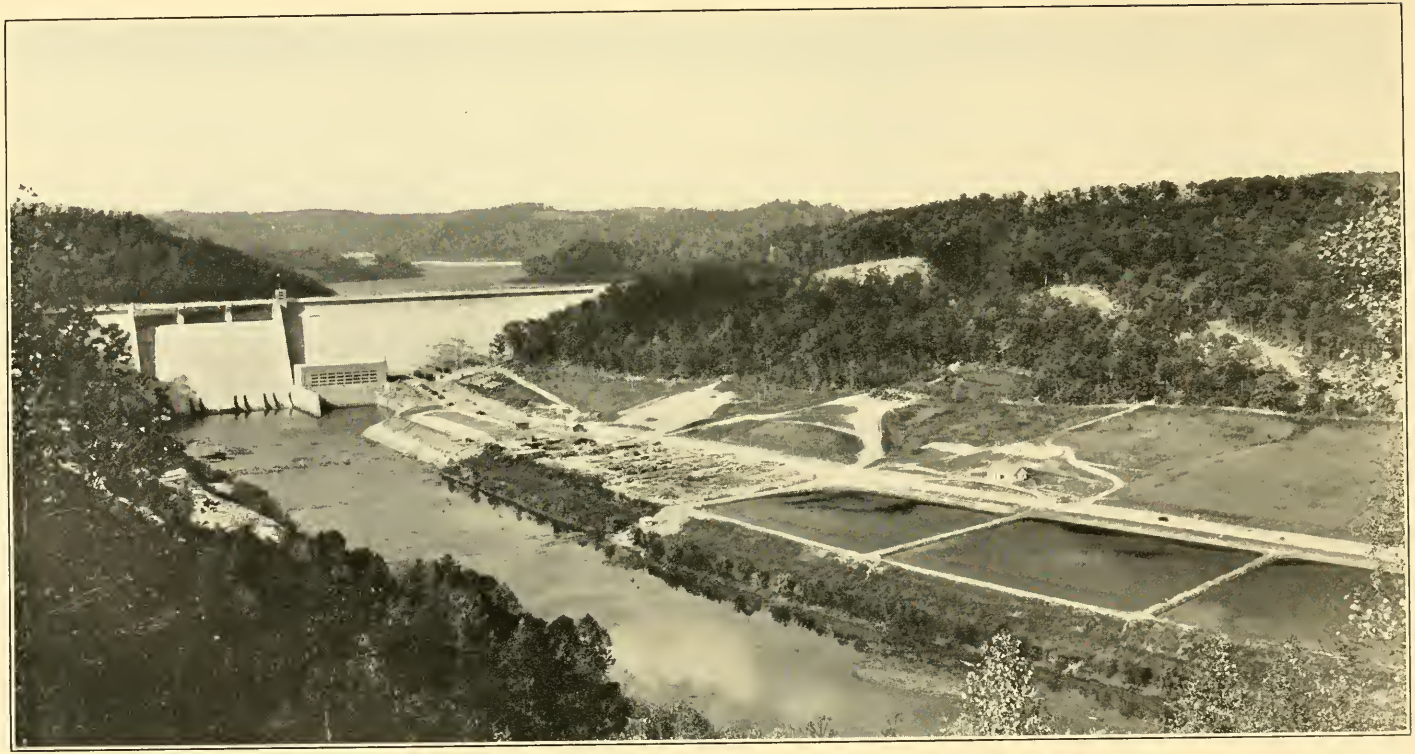

FIGURE 1.—HATCHING PONDS BELOW NORRIS DAM, TENN.

Hatchery constructed by Tennessee Valley Authority for operation by Bureau of Fisheries.

can or cannot do in the way of increasing the supply of fish in their strictly local waters.

In summary, there are three institutions engaged in propagating fish for public benefit; namely, the Federal Government, the States, and semi-public clubs. From a practical standpoint they might well be considered as parts of the same organization and the ultimate objective sought is that the work be carried on as if this situation actually prevailed.

## SALVAGE OPERATIONS

The Upper Mississippi Wild Life and Fish Refuge was again the scene of the activities of seining crews salvaging stranded fish from land-locked pools stretching several hundred miles along the river. While the entire territory included in the refuge could not be fully covered by the crews, a total of 43,500,000 fish was saved from the sure death of receding waters and transferred to the main river or distributed to other waters. The latter disposal accounted for only a small fraction of the total number handled. Slightly over 850,000 were utilized for the filling of applications away from the river.

A strong demand has been built up in the Middle West for these fish since they are of large fingerling size when seined and are highly valuable for stocking. The Bureau has not been able to accede to this demand because it is felt that diversion of the fish to distant points would be an unjustifiable drain upon the resources of the Refuge. The future shipments from this source will be even less for the reason that the development of the 9 foot channel up to the Twin Cities is automatically going to make salvage work unnecessary and impossible. Already the progress of construction has limited salvage operations and within a year or two the rescue work will be largely a thing of the past. In lieu of this the Bureau is establishing large propagating ponds at various points within the refuge for the production of fish for distribution. Means will have to be devised to augment the area of these ponds if the demands are to be met in the future.

*Number and disposition of fish rescued, fiscal year 1936*

| Locality and species | Delivered to applicants | Restored to original waters | Total number of fish |
|---|---|---|---|
| All stations: | | | |
| Black bass | 188, 140 | 141, 695 | 329, 835 |
| Buffalofish | | 1, 218, 125 | 1, 218, 125 |
| Carp | | 3, 267, 600 | 3, 267, 600 |
| Catfish | 49, 875 | 6, 207, 820 | 6, 257, 695 |
| Crappie | 259, 375 | 15, 706, 655 | 15, 966, 030 |
| Drum | | 3, 290 | 3, 290 |
| Pike-Pickerel | 1, 900 | 773, 252 | 775, 152 |
| Sunfish | 347, 660 | 13, 506, 880 | 13, 854, 540 |
| White bass | | 17, 000 | 17, 000 |
| Yellow perch | 4, 626 | 116, 078 | 120, 704 |
| Miscellaneous Fishes | | 1, 709, 400 | 1, 709, 400 |
| Total | 851, 576 | 42, 667, 795 | 43, 519, 371 |
| Summary by stations: | | | |
| Fairport | 292, 145 | 992, 810 | 1, 284, 955 |
| La Crosse | 20, 165 | 3, 501, 956 | 3, 522, 121 |
| Lynxville | 23, 240 | 7, 564, 950 | 7, 588, 190 |
| Bellevue | 98, 480 | 5, 617, 270 | 5, 715, 750 |
| Homer | 251, 291 | 3, 117, 834 | 3, 369, 125 |
| Marquette | 166, 255 | 21, 872, 975 | 22, 039, 230 |
| Total | 851, 576 | 42, 667, 795 | 43, 519, 371 |

## ASSIGNMENTS OF FISH AND FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

Thirty-two States have included in their output fish which were derived directly or indirectly from Federal hatchery operations. In fact 639,000,000 eggs, fry, and fingerlings comprised the total of assignments to the State Fish and Game Departments. The bulk of these were eggs since these constituted raw material which can be most easily handled in transit. It should be pointed out that this does not all represent "Federal aid" or donations but in many instances the assignments are the result of cooperative arrangements under which the States stand their full share of the cost of producing the fish or eggs which they receive.

There has been a constant increase in the totals covered by these cooperative relationships. The following list shows no shipments made to foreign countries. There was, however, a routine exchange of eggs with the Dominion of Canada. This is an annual arrangement whereby the Bureau obtains Atlantic salmon eggs as compensation for assignment of cut-throat trout eggs. It will also be noted that a shipment of rainbow trout eggs was made to Puerto Rico in continuation of the program of the insular Government to establish this game species in the mountainous sections of the Island.

The services of the Assistant Chief of the Division of Fish Culture were loaned to make a survey of Lake Titicaca, South America, for the Peruvian and Bolivian Governments. No shipments of fish have as yet been made as a consequence of this study, however.

*Assignments of fish and fish eggs to State fish commissions, fiscal year 1936*

| States and species | Eggs | Fry | Fingerlings et cetera | Totals |
|---|---|---|---|---|
| Arizona: | | | | |
| Blackspotted trout | 750,000 | | | 750,000 |
| Brook trout | 302,000 | | | 302,000 |
| Arkansas: | | | | |
| Black bass, smallmouth | | 100,000 | | 100,000 |
| Colorado: | | | | |
| Lake trout | 25,620 | | | 25,620 |
| Loch Leven trout | 600,160 | | | 600,160 |
| Connecticut: | | | | |
| Black bass, smallmouth | | 409,000 | | 409,000 |
| Lake trout | 25,000 | | | 25,000 |
| Loch Leven trout | 100,500 | | | 100,500 |
| Rainbow trout | 100,000 | | | 100,000 |
| Georgia: | | | | |
| Black bass, largemouth | | | 48,795 | 48,795 |
| Black bass, smallmouth | | 80,000 | | 80,000 |
| Catfish | | | 3,045 | 3,045 |
| Sunfish | | | 324,150 | 324,150 |
| Rainbow trout | 301,600 | | | 301,600 |
| Idaho: | | | | |
| Blackspotted trout | | | 182,000 | 182,000 |
| Brook trout | 102,500 | | 17,500 | 120,000 |
| Loch Leven trout | | | 52,000 | 52,000 |
| Rainbow trout | 500,160 | | 975,000 | 1,475,160 |
| Steelhead salmon | | | 46,500 | 46,500 |
| Illinois: | | | | |
| Black bass, largemouth | | | 13,500 | 13,500 |
| Catfish | | | 12,000 | 12,000 |
| Crappie | | | 10,000 | 10,000 |
| Sunfish | | | 20,000 | 20,000 |
| Indiana: | | | | |
| Brook trout | 154,800 | | | 154,800 |
| Loch Leven trout | 180,600 | | | 180,600 |
| Rainbow trout | 42,600 | | | 42,600 |
| Black bass | | | 51,125 | 51,125 |
| Catfish | | | 9,200 | 9,200 |
| Rock bass | | | 4,000 | 4,000 |
| Sunfish | | | 178,600 | 178,600 |
| Yellow perch | | | 4,000 | 4,000 |

*Assignments of fish and fish eggs to State fish commissions, fiscal year 1936*—Con.

| States and species | Eggs | Fry | Fingerlings et cetera | Totals |
|---|---|---|---|---|
| Iowa: | | | | |
| Black bass, largemouth | | | 10,000 | 10,000 |
| Crappie | | | 15,000 | 15,000 |
| Sunfish | | | 13,500 | 13,500 |
| Brook trout | 5,000 | | | 5,000 |
| Loch Leven trout | 101,000 | | | 101,000 |
| Rainbow trout | 40,000 | | | 40,000 |
| Maine: | | | | |
| Atlantic salmon | 1,000,000 | | | 1,000,000 |
| Maryland: | | | | |
| Rainbow trout | 75,000 | | | 75,000 |
| Massachusetts: | | | | |
| Loch Leven trout | 100,500 | | | 100,500 |
| Rainbow trout | 100,000 | | | 100,000 |
| Michigan: | | | | |
| Brook trout | 508,000 | | 11,735 | 519,735 |
| Rainbow trout | | | 4,000 | 4,000 |
| Minnesota: | | | | |
| Black bass, largemouth | | | 16,500 | 16,500 |
| Lake trout | | | 11,000 | 11,000 |
| Montana: | | | | |
| Loch Leven trout | 2,000,000 | | | 2,000,000 |
| Black bass, largemouth | | | 25,830 | 25,830 |
| Catfish | | | 6,000 | 6,000 |
| Crappie | | | 3,500 | 3,500 |
| Sunfish | | | 25,500 | 25,500 |
| Yellow perch | | | 18,700 | 18,700 |
| Nebraska: | | | | |
| Brook trout | | | 3,500 | 3,500 |
| Loch Leven trout | | | 15,500 | 15,500 |
| Rainbow trout | 57,000 | | | 57,000 |
| New Hampshire: | | | | |
| Brook trout | 500,000 | 433,500 | 8,900 | 942,400 |
| New Mexico: | | | | |
| Black bass | | | 201,000 | 201,000 |
| Catfish | | | 17,300 | 17,300 |
| Crappie | | | 5,000 | 5,000 |
| Sunfish | | | 56,000 | 56,000 |
| North Carolina: | | | | |
| Brook trout | | | 28,000 | 28,000 |
| Loch Leven trout | 361,500 | | | 361,500 |
| Rainbow trout | 101,000 | | 135,200 | 236,200 |
| North Dakota: | | | | |
| Black bass | | | 7,720 | 7,720 |
| Crappie | | | 7,000 | 7,000 |
| Sunfish | | | 16,000 | 16,000 |
| Ohio: | | | | |
| Pike perch | 548,480,000 | | | 548,480,000 |
| Rainbow trout | | | 30,000 | 30,000 |
| Whitefish | | 32,680,000 | | 32,680,000 |
| Oregon: | | | | |
| Blackspotted trout | | | 97,800 | 97,800 |
| Chinook salmon | 15,490,000 | | | 15,490,000 |
| Rainbow trout | | | 260,580 | 260,580 |
| Silver salmon | | | 9,600 | 9,600 |
| Steelhead trout | 600,000 | | | 600,000 |
| South Carolina: | | | | |
| Black bass | | 11,500 | | 11,500 |
| Loch Leven trout | 50,500 | | | 50,500 |
| Rainbow trout | | | 17,000 | 17,000 |
| South Dakota: | | | | |
| Loch Leven trout | 206,500 | | | 206,500 |
| Tennessee: | | | | |
| Loch Leven trout | 103,700 | | 60,000 | 163,700 |
| Rainbow trout | 550,000 | | 110,000 | 660,000 |
| Sunfish | | | 2,500 | 2,500 |
| Utah: | | | | |
| Brook trout | | | 81,000 | 81,000 |
| Grayling | 125,000 | | | 125,000 |
| Rainbow trout | | | 75,000 | 75,000 |
| Vermont: | | | | |
| Brook trout | 500,000 | 384,680 | 62,000 | 946,680 |
| Landlocked salmon | | 67,000 | 46,000 | 113,000 |
| Pike perch | 11,605,000 | | | 11,605,000 |
| Yellow perch | 11,050,000 | | | 11,050,000 |
| Virginia: | | | | |
| Brook trout | 760,000 | | 25,000 | 785,000 |
| Rainbow trout | | | 150,340 | 150,340 |
| Washington: | | | | |
| Blackspotted trout | | | 5,000 | 5,000 |
| Grayling | | | 125,000 | 125,000 |
| Rainbow trout | | | 543,600 | 543,600 |

*Assignments of fish and fish eggs to State fish commissions, fiscal year 1936*—Con.

| States and species | Eggs | Fry | Fingerlings et cetera | Totals |
|---|---|---|---|---|
| West Virginia: | | | | |
| Brook trout | 750, 000 | | 213, 050 | 963, 050 |
| Loch Leven trout | 501, 000 | | 388, 500 | 889, 500 |
| Rainbow trout | | | 541, 000 | 541, 000 |
| Wisconsin: | | | | |
| Black bass | | | 28, 350 | 28, 350 |
| Crappie | | | 17, 300 | 17, 300 |
| Loch Leven trout | | | 28, 250 | 28, 250 |
| Sunfish | | | 16, 700 | 16, 700 |
| Wyoming: | | | | |
| Brook trout | | | 27, 000 | 27, 000 |
| Loch Leven trout | 680, 300 | | | 680, 300 |
| Total | 599, 586, 540 | 34, 165, 680 | 5, 574, 370 | 639, 326, 590 |

*Assignments of fish and fish eggs to territories, fiscal year 1936*

| Territory and species | Eggs |
|---|---|
| Puerto Rico: Rainbow trout | 100, 000 |

## TRANSFER OF EGGS BETWEEN STATIONS

There is a great difference in the efficiency of hatcheries due to varying local conditions. At certain points brood stock can be reared most economically for egg production and these hatcheries are used as sources of general supply for trout eggs for the entire Bureau. The accompanying table showing the transfer of eggs between stations will illustrate the extent of this practice. In some instances, as in the case of the Creede, Colo., and Ennis, Mont., stations, the eggs are collected from wild or semi-wild fish. This procedure has made it possible to secure a stock of eggs from the Bureau's own resources without the necessity of purchasing any from commercial sources.

*Transfer of eggs between stations, fiscal year 1936*

| Species | Number of eggs | From— | To— |
|---|---|---|---|
| Black-spotted trout | 150, 420 | Saratoga, Wyo | Bozeman, Mont. |
| | 150, 300 | do | Springville, Utah. |
| | 481, 700 | Yellowstone Park, Wyo | Bozeman, Mont. |
| | 704, 000 | do | Birdsview, Wash. |
| | 250, 000 | do | Clackamas, Oreg. |
| | 350, 000 | do | Crawford, Nebr. |
| | 1, 500, 000 | do | Jackson Hole, Wyo. |
| | 500, 000 | do | Hagerman, Idaho. |
| | 1, 325, 000 | do | Leadville, Colo. |
| | 700, 000 | do | Quinault, Wash. |
| | 200, 000 | do | Saratoga, Wyo. |
| | 75, 000 | do | Spearfish, S. D. |
| | 2, 150, 000 | do | Springville, Utah. |
| Brook trout | 150, 000 | Berkshire, Mass | Nashua, N. H. |
| | 45, 000 | Craig Brook, Maine | Duluth, Minn. |
| | 200, 000 | do | La Crosse, Wis. |
| | 100, 000 | do | Manchester, Iowa. |
| | 570, 000 | do | Nashua, N. H. |
| | 200, 000 | do | Northville, Mich. |
| | 200, 000 | do | Ogletown, Pa. |
| | 400, 000 | do | White Sulphur Springs, W. Va. |
| | 600, 000 | do | Wytheville, Va. |
| | 251, 000 | Leadville, Colo | Crawford, Nebr. |
| | 104, 000 | do | Creede, Colo. |
| | 202, 000 | do | La Crosse, Wis. |
| | 102, 000 | do | Hagerman, Idaho. |
| | 405, 000 | do | Saratoga, Wyo. |

*Transfer of eggs between stations, fiscal year 1936*—Continued

| Species | Number of eggs | From— | To— |
|---|---|---|---|
| Brook trout | 355,000 | Leadville, Colo | Spearfish, S. D. |
| | 400,000 | do | Springville, Utah. |
| | 300,550 | Creede, Colo | Bozeman, Mont. |
| | 508,475 | do | Duluth, Minn. |
| | 150,750 | do | La Crosse, Wis. |
| | 100,400 | do | Lake Mills, Wis. |
| | 100,430 | do | Manchester, Iowa. |
| | 502,460 | do | Northville, Mich. |
| | 250,000 | do | Spearfish, S. D. |
| | 602,250 | do | Springville, Utah. |
| | 100,000 | do | Clackamas, Oreg. |
| | 100,535 | Pittsford, Vt | Cape Vincent, N. Y. |
| | 50,000 | do | Leetown, W. Va. |
| | 262,450 | do | Berlin, N. H. |
| | 200,000 | York Pond, N. H | Barneveld, N. Y. |
| | 795,000 | do | Cape Vincent, N. Y. |
| | 450,000 | do | Cortland, N. Y. |
| | 450,000 | do | Erwin, Tenn. |
| | 308,000 | do | St. Johnsbury, Vt. |
| | 650,000 | do | White Sulphur Springs, W. Va. |
| Brook trout | 107,100 | Saratoga, Wyo | Jackson Hole, Wyo. |
| Grayling | 500,000 | Yellowstone Park, Wyo | Bozeman, Mont. |
| | 100,000 | do | Spearfish, S. Dak. |
| | 357,000 | do | Spokane, Wash. |
| | 500,000 | do | Springville, Utah. |
| Lake trout | 30,000 | Cape Vincent, N. Y | Cortland, N. Y. |
| Landlocked salmon | 20,000 | Craig Brook, Maine | Nashua, N. H. |
| Lock Leven trout | 100,580 | Bozeman, Mont | Cape Vincent, N. Y. |
| | 487,200 | do | Clackamas, Oreg. |
| | 172,800 | do | Crawford, Nebr. |
| | 151,340 | do | Duluth, Minn. |
| | 50,500 | do | Erwin, Tenn. |
| | 273,680 | do | Hagerman, Idaho. |
| | 332,440 | do | La Crosse, Wis. |
| | 151,200 | do | Lake Mills, Wis. |
| | 100,700 | do | Leetown, W. Va. |
| | 356,400 | do | Manchester, Iowa. |
| | 50,500 | do | Ogletown, Pa. |
| | 100,500 | do | Rochester, N. Y. |
| | 384,600 | do | Saratoga, Wyo. |
| | 356,400 | do | Spearfish, S. Dak. |
| | 610,440 | do | Springville, Utah. |
| | 251,500 | do | White Sulphur Spr., W. Va. |
| Rainbow trout | 100,320 | do | Butte Falls, Oreg. |
| | 250,400 | do | Glacier Park, Mont. |
| | 1,416,000 | do | Meadow Creek, Mont. |
| | 201,600 | do | Quinault, Wash. |
| | 361,600 | do | Spearfish, S. Dak. |
| | 150,320 | do | Spokane, Wash. |
| | 362,900 | Manchester, Iowa | Bozeman, Mont. |
| | 331,100 | do | Crawford, Nebr. |
| | 153,100 | do | Duluth, Minn. |
| | 303,000 | do | La Crosse, Wis. |
| | 76,000 | do | Lake Mills, Wis. |
| | 305,600 | do | Northville, Mich. |
| | 15,000 | Neosho, Mo | Aquarium, Wash., D. C. |
| | 310,000 | do | Bozeman, Mont. |
| | 102,000 | do | Butte Falls, Oreg. |
| | 97,000 | do | Crawford, Nebr. |
| | 80,000 | do | Ogletown, Pa. |
| | 612,000 | do | Saratoga, Wyo. |
| | 166,780 | Springville, Utah | Birdsview, Wash. |
| | 350,550 | do | Hagerman, Idaho. |
| | 100,640 | do | Quinault, Wash. |
| | 100,000 | White Sulphur Springs, W. Va | Ogletown, Pa. |
| | 25,000 | Wytheville, Va | Aquarium, Wash., D. C. |
| | 100,000 | do | Barneveld, N. Y. |
| | 75,000 | do | Rochester, N. Y. |
| Silver salmon | 70,000 | Birdsview, Wash | Leetown, W. Va. |

## STATION OUTPUT

The following summary indicates the location of the producing units and the number and species which each has contributed to the replenishment of the lakes and streams of the country. Forty-three main stations and 38 substations are listed, representing an increase of 4 substations over the summary for last year. This increase arises

from the placing in operation of new projects at Spokane, Wash., San Angelo, Tex., Harrison Lake, Va., and the reestablishment of limited operations at the Swanton, Vt., station previously closed. While each of these hatcheries is primarily intended for the restocking of waters in its own contiguous area, the output of any of them may nevertheless reach 2 or 3 different States. The designation as main station or substation is not necessarily due to the size of the establishment or the magnitude of output but is a more or less arbitrary separation for administrative purposes.

It appears advisable to repeat the statement in previous reports that all carp shown in the list are replanted directly in commercial fishing waters, from which the eggs are secured and in which this species is now well established. No carp are planted except under the foregoing conditions.

*Stations and substations operated and the output of each, fiscal year 1936*

| Stations, substations, and species | Eggs | Fry | Fingerlings | Totals |
|---|---|---|---|---|
| Baird, Calif.: | | | | |
| Chinook salmon | | | 5,260 | 5,260 |
| Battle Creek, Calif.: | | | | |
| Chinook salmon | | | 5,055,410 | 5,055,410 |
| Mill Creek, Calif.: | | | | |
| Chinook salmon | | 1,620,000 | 3,141,735 | 4,761,735 |
| Birdsview, Wash.: | | | | |
| Blackspotted trout | | | 352,000 | 352,000 |
| Chinook salmon | | | 136,000 | 136,000 |
| Silver salmon | 25,000 | | 2,762,000 | 2,787,000 |
| Sockeye salmon | | | 269,500 | 269,500 |
| Steelhead trout | | | 289,000 | 289,000 |
| Baker Lake, Wash.: | | | | |
| Blackspotted trout | | | 48,700 | 48,700 |
| Mt. Rainier, Wash.: | | | | |
| Blackspotted trout | | | 188,900 | 188,900 |
| Brook trout | | | 308,445 | 308,445 |
| Rainbow trout | | | 292,400 | 292,400 |
| Steelhead trout | | | 17,600 | 17,600 |
| Spokane, Wash.: | | | | |
| Blackspotted trout | | | 21,750 | 21,750 |
| Grayling | | | 250,000 | 250,000 |
| Rainbow trout | | | 266,620 | 266,620 |
| Berkshire Trout Hatchery, Mass.: | | | | |
| Brook trout | | | 114,630 | 114,630 |
| Catfish | | | 1,525 | 1,525 |
| Black bass, smallmouth | | 840,000 | | 840,000 |
| Boothbay Harbor, Maine: | | | | |
| Cod | 953,619,000 | | | 953,619,000 |
| Flounder | | 1,015,200,000 | | 1,015,200,000 |
| Haddock | 135,094,000 | | | 135,094,000 |
| Bozeman, Mont.: | | | | |
| Blackspotted trout | | | 1,814,150 | 1,814,150 |
| Brook trout | | | 276,135 | 276,135 |
| Loch Leven trout | 6,134,660 | | | 6,134,660 |
| Rainbow trout | | | 744,815 | 744,815 |
| Ennis, Mont.: | | | | |
| Blackspotted trout | | | 236,370 | 236,370 |
| Loch Leven trout | 1,460,000 | 1,105,000 | 1,285,130 | 3,850,130 |
| Rainbow trout | | | 700,205 | 700,205 |
| Miles City, Mont.: | | | | |
| Black bass, largemouth | | | 93,030 | 93,030 |
| Catfish | | | 12,100 | 12,100 |
| Crappie | | | 46,660 | 46,660 |
| Sunfish | | | 72,635 | 72,635 |
| Yellow perch | | | 18,720 | 18,720 |
| Cape Vincent, N. Y.: | | | | |
| Brook trout | | | 1,500 | 1,500 |
| Lake herring | 400,000 | 2,740,000 | | 3,140,000 |
| Lake trout | 35,000 | 493,000 | 2,700 | 530,700 |
| Loch Leven trout | 35,000 | | | 35,000 |
| Black bass, smallmouth | | | 49,900 | 49,900 |
| Whitefish | | 3,125,000 | | 3,125,000 |
| Barneveld, N. Y.: | | | | |
| Brook trout | | | 66,900 | 66,900 |
| Loch Leven trout | | | 16,500 | 16,500 |
| Rainbow trout | | | 7,950 | 7,950 |

*Stations and substations operated and the output of each, fiscal year 1936*—Contd.

| Stations, substations, and species | Eggs | Fry | Fingerlings | Totals |
|---|---|---|---|---|
| Cape Vincent, N. Y.—Continued. | | | | |
| Cortland, N. Y.: | | | | |
| Brook trout | | | 135,770 | 135,770 |
| Swanton, Vt.: | | | | |
| Pike perch | 11,605,000 | | | 11,605,000 |
| Yellow perch | 11,050,000 | | | 11,050,000 |
| Rochester, N. Y.: | | | | |
| Black bass, largemouth | | | 3,000 | 3,000 |
| Brook trout | | | 4,160 | 4,160 |
| Loch Leven trout | | | 75,570 | 75,570 |
| Smallmouth bass | | | 14,500 | 14,500 |
| Rainbow trout | | | 80,920 | 80,920 |
| Watertown, N. Y.: | | | | |
| Brook trout | | | 104,015 | 104,015 |
| Lake trout | | 27,960 | 46,875 | 74,835 |
| Loch Leven trout | | | 77,250 | 77,250 |
| Rainbow trout | | | 1,460 | 1,460 |
| Clackamas, Oreg.: | | | | |
| Blackspotted trout | | | 97,800 | 97,800 |
| Brook trout | 50,000 | | 98,900 | 148,900 |
| Chinook salmon | | | 5,242,000 | 5,242,000 |
| Loch Leven trout | 78,000 | | | 78,000 |
| Rainbow trout | 50,000 | | 214,580 | 264,580 |
| Silver salmon | | | 33,480 | 33,480 |
| Big White Salmon, Wash.: | | | | |
| Chinook salmon | 4,484,000 | | 10,161,225 | 14,645,225 |
| Butte Falls, Oreg.: | | | | |
| Blackspotted trout | | | 125,000 | 125,000 |
| Chinook salmon | | | 18,297,680 | 18,297,680 |
| Silver salmon | | | 674,600 | 674,600 |
| Steelhead trout | 600,000 | | 302,900 | 902,900 |
| Little White Salmon, Wash.: | | | | |
| Chinook salmon | 21,960,000 | | 11,584,335 | 33,544,335 |
| Craig Brook, Maine: | | | | |
| Atlantic salmon | 1,000,000 | | 568,000 | 1,568,000 |
| Brook trout | | | 460,800 | 460,800 |
| Landlocked salmon | | | 394,500 | 394,500 |
| Smelt | 5,000,000 | | | 5,000,000 |
| Crawford, Nebr.: | | | | |
| Black bass, largemouth | | | 82,340 | 82,340 |
| Blackspotted trout | | | 333,565 | 333,565 |
| Brook trout | | | 358,850 | 358,850 |
| Catfish | | | 226,300 | 226,300 |
| Crappie | | | 64,975 | 64,975 |
| Lock Leven trout | | | 287,600 | 287,600 |
| Rainbow trout | | | 444,860 | 444,860 |
| Rock bass | | | 9,100 | 9,100 |
| Sunfish | | | 3,600 | 3,600 |
| Dexter, N. Mex.: | | | | |
| Black bass, largemouth | | | 363,310 | 363,310 |
| Catfish | | | 21,055 | 21,055 |
| Crappie | | | 5,750 | 5,750 |
| Sunfish | | | 100,585 | 100,585 |
| Duluth, Minn.: | | | | |
| Brook trout | | | 226,000 | 226,000 |
| Lake trout | 25,600 | 192,500 | 64,000 | 282,100 |
| Lock Leven trout | | | 52,000 | 52,000 |
| Pike perch | | 9,670,000 | | 9,670,000 |
| Rainbow trout | | | 33,000 | 33,000 |
| Whitefish | | 1,275,000 | | 1,275,000 |
| Edenton, N. C.: | | | | |
| Black bass, largemouth | | 16,200 | 15,750 | 31,950 |
| Shad | | 2,600,000 | | 2,600,000 |
| Sunfish | | | 23,700 | 23,700 |
| Warmouth bass | | | 175 | 175 |
| Yellow perch | | | 385 | 385 |
| Erwin, Tenn.: | | | | |
| Black bass, largemouth | | 20,000 | 2,790 | 22,790 |
| Brook trout | | | 100,000 | 100,000 |
| Lock Leven trout | | | 18,500 | 18,500 |
| Rainbow trout | | | 570,275 | 570,275 |
| Rock bass | | | 23,400 | 23,400 |
| Sunfish | | | 129,175 | 129,175 |
| Fairport, Iowa: | | | | |
| Black bass, largemouth | | 54,500 | 95,400 | 149,900 |
| Buffalofish | 84,212,500 | | 46,525 | 84,259,025 |
| Carp | 1,500,000 | | 158,600 | 1,658,600 |
| Catfish | | | 451,185 | 451,185 |
| Crappie | | | 232,760 | 232,760 |
| Drum | | | 35 | 35 |
| Sunfish | | | 266,825 | 266,825 |
| White bass | | | 225 | 225 |
| Yellow perch | | | 1,000 | 1,000 |
| Miscellaneous fishes | | | 32,400 | 32,400 |

*Stations and substations operated and the output of each, fiscal year 1936*—Contd.

| Stations, substations, and species | Eggs | Fry | Fingerlings | Totals |
|---|---|---|---|---|
| Flintville, Tenn.: | | | | |
| Black bass, largemouth | | | 4,150 | 4,150 |
| Black bass, smallmouth | | | 75 | 75 |
| Crappie | | | 50 | 50 |
| Loch Leven trout | | | 114,000 | 114,000 |
| Rainbow trout | | | 161,000 | 161,000 |
| Rock bass | | | 1,200 | 1,200 |
| Sunfish | | | 8,925 | 8,925 |
| Fort Belvoir, Va.: | | | | |
| Black bass, largemouth | | | 1,555 | 1,555 |
| Crappie | | | 400 | 400 |
| Shad | | 11,850,000 | | 11,850,000 |
| Sunfish | | | 1,225 | 1,225 |
| Yellow perch | | 307,958,000 | | 307,958,000 |
| Lakelands Ponds, Md.: | | | | |
| Black bass, largemouth | | | 100 | 100 |
| Crappie | | | 510 | 510 |
| Yellow perch | | | 2,200 | 2,200 |
| Sunfish | | | 72,100 | 72,100 |
| Gloucester, Mass.: | | | | |
| Cod | 2,463,113,000 | 262,662,000 | | 2,725,775,000 |
| Flatfish | 43,854,000 | 19,512,000 | | 63,366,000 |
| Haddock | 284,642,000 | 95,588,000 | | 380,230,000 |
| Pollock | 793,831,700 | 475,457,700 | | 1,269,289,400 |
| Hagerman, Idaho: | | | | |
| Blackspotted trout | | | 58,380 | 58,380 |
| Brook trout | | | 46,140 | 46,140 |
| Loch Leven trout | | | 52,000 | 52,000 |
| Rainbow trout | | | 769,100 | 769,100 |
| Salmon, Idaho: | | | | |
| Blackspotted trout | | | 93,450 | 93,450 |
| Rainbow trout | | | 659,700 | 659,700 |
| Steelhead trout | | | 46,500 | 46,500 |
| La Crosse, Wis.: | | | | |
| Black bass, largemouth | | | 18,000 | 18,000 |
| Brook trout | | | 539,200 | 539,200 |
| Buffalofish | | | 92,300 | 92,300 |
| Carp | | | 483,500 | 483,500 |
| Catfish | | | 352,200 | 352,200 |
| Crappie | | | 1,375,000 | 1,375,000 |
| Loch Leven trout | | | 350,900 | 350,900 |
| Pike-Pickerel | | | 321,800 | 321,800 |
| Rainbow trout | | | 295,600 | 295,600 |
| Sunfish | | | 849,800 | 849,800 |
| White bass | | | 700 | 700 |
| Yellow perch | | | 19,200 | 19,200 |
| Bellevue, Iowa: | | | | |
| Black bass, largemouth | | | 84,500 | 84,500 |
| Buffalofish | 68,125,000 | | 257,900 | 68,382,900 |
| Carp | 59,000,000 | | 661,000 | 59,661,000 |
| Catfish | | | 598,500 | 598,500 |
| Crappie | | | 1,822,875 | 1,822,875 |
| Drum | | | 1,400 | 1,400 |
| Pike-Pickerel | | | 2,600 | 2,600 |
| Sunfish | | | 1,706,250 | 1,706,250 |
| White bass | | | 6,475 | 6,475 |
| Yellow perch | | | 2,650 | 2,650 |
| Miscellaneous fishes | | | 556,000 | 556,000 |
| Homer, Minn.: | | | | |
| Black bass, largemouth | | | 13,700 | 13,700 |
| Buffalofish | | | 100 | 100 |
| Carp | | | 12,000 | 12,000 |
| Catfish | | | 75,800 | 75,800 |
| Crappie | | | 1,824,700 | 1,824,700 |
| Drum | | | 1,850 | 1,850 |
| Pike-Pickerel | | | 404,150 | 404,150 |
| Sunfish | | | 522,225 | 522,225 |
| White bass | | | 2,400 | 2,400 |
| Yellow perch | | | 4,200 | 4,200 |
| Miscellaneous fishes | | | 508,000 | 508,000 |
| Lake Mills, Wis.: | | | | |
| Black bass, largemouth | | | 13,650 | 13,650 |
| Black bass, smallmouth | | | 10,165 | 10,165 |
| Brook trout | | | 89,500 | 89,500 |
| Crappie | | | 1,400 | 1,400 |
| Loch Leven trout | | | 86,000 | 86,000 |
| Rainbow trout | | | 63,850 | 63,850 |
| Rock bass | | | 2,300 | 2,300 |
| Sunfish | | | 5,575 | 5,575 |
| Lynxville, Wis.: | | | | |
| Black bass, largemouth | | | 13,800 | 13,800 |
| Buffalofish | | | 28,500 | 28,500 |
| Carp | | | 51,500 | 51,500 |
| Catfish | | | 207,000 | 207,000 |

*Stations and substations operated and the output of each, fiscal year 1936*—Contd.

| Stations, substations, and species | Eggs | Fry | Fingerlings | Totals |
|---|---|---|---|---|
| La Crosse, Wis.—Continued. | | | | |
| Lynxville, Wis.—Continued. | | | | |
| Crappie | | | 3,040,000 | 3,040,000 |
| Pike-pickerel | | | 4,200 | 4,200 |
| Sunfish | | | 1,622,440 | 1,622,440 |
| White bass | | | 3,600 | 3,600 |
| Yellow perch | | | 4,150 | 4,150 |
| Miscellaneous fishes | | | 603,000 | 603,000 |
| Marquette, Iowa: | | | | |
| Black bass, largemouth | | | 56,800 | 56,800 |
| Buffalofish | | | 792,800 | 792,800 |
| Carp | | | 1,901,000 | 1,901,000 |
| Catfish | | | 4,548,000 | 4,548,000 |
| Crappie | | | 7,670,700 | 7,670,700 |
| Pike-pickerel | | | 42,400 | 42,400 |
| Sunfish | | | 6,887,000 | 6,887,000 |
| White bass | | | 3,600 | 3,600 |
| Yellow perch | | | 89,300 | 89,300 |
| Rochester, Ind. | | | | |
| Black bass, largemouth | | | 83,285 | 83,285 |
| Black bass, smallmouth | | | 200 | 200 |
| Catfish | | | 11,800 | 11,800 |
| Crappie | | | 1,825 | 1,825 |
| Rock bass | | | 17,950 | 17,950 |
| Sunfish | | | 142,830 | 142,830 |
| Yellow perch | | | 5,100 | 5,100 |
| Upper Mississippi River Ponds: | | | | |
| Black bass, largemouth | | 128,000 | 304,775 | 432,775 |
| Black bass, smallmouth | | | 1,125 | 1,125 |
| Catfish | | | 7,010 | 7,010 |
| Crappie | | | 20,950 | 20,950 |
| Sunfish | | | 37,715 | 37,715 |
| Lake Park, Ga.: | | | | |
| Black bass, largemouth | | | 3,055 | 3,055 |
| Catfish | | | 6,808 | 6,880 |
| Sunfish | | | 226,700 | 226,700 |
| Warm Springs, Ga.: | | | | |
| Black bass, largemouth | | 11,900 | 333,625 | 345,525 |
| Catfish | | | 1,560 | 1,560 |
| Sunfish | | | 458,050 | 458,050 |
| Lamar, Pa.: | | | | |
| Brook trout | | | 97,060 | 97,060 |
| Loch Leven trout | | | 14,150 | 14,150 |
| Rainbow trout | | | 61,500 | 61,500 |
| Leadville, Colo.: | | | | |
| Blackspotted trout | | | 581,000 | 581,000 |
| Brook trout | 1,320,000 | | 2,442,000 | 3,762,000 |
| Loch Leven trout | 100,000 | | 158,000 | 258,000 |
| Rainbow trout | | | 729,600 | 729,600 |
| Creede, Colo.: | | | | |
| Blackspotted trout | | | 427,700 | 427,700 |
| Brook trout | 1,773,700 | | 1,520,250 | 3,293,950 |
| Loch Leven trout | | | 75,020 | 75,020 |
| Rainbow trout | | | 543,550 | 543,550 |
| Eagles Nest, N. Mex.: | | | | |
| Blackspotted trout | | | 55,000 | 55,000 |
| Brook trout | | | 16,000 | 16,000 |
| Loch Leven trout | | | 70,500 | 70,500 |
| Rainbow trout | | | 249,000 | 249,000 |
| Leetown, W. Va.: | | | | |
| Black bass, largemouth | | | 1,355 | 1,355 |
| Black bass, smallmouth | | | 29,565 | 29,565 |
| Blackspotted trout | | | 700 | 700 |
| Brook trout | | | 61,375 | 61,375 |
| Loch Leven trout | | | 29,400 | 29,400 |
| Rainbow trout | | | 138,120 | 138,120 |
| Silver salmon | | | 27,000 | 27,000 |
| Sunfish | | | 4,600 | 4,600 |
| Louisville, Ky.: | | | | |
| Black bass, largemouth | | | 29,200 | 29,200 |
| Black bass, smallmouth | | 250,000 | 3,950 | 253,950 |
| Crappie | | | 150 | 150 |
| Rock bass | | | 4,410 | 4,410 |
| Sunfish | | | 2,900 | 2,900 |
| Mammoth Spring, Ark.: | | | | |
| Black bass, largemouth | | | 174,925 | 174,925 |
| Black bass, smallmouth | | 165,000 | 100,225 | 265,225 |
| Rock bass | | | 25,500 | 25,500 |
| Sunfish | | | 81,000 | 81,000 |
| Manchester, Iowa: | | | | |
| Black bass, smallmouth | | | 8,930 | 8,930 |
| Brook trout | 5,000 | | 167,350 | 172,350 |
| Loch Leven trout | 60,000 | | 232,700 | 292,700 |
| Rainbow trout | 151,300 | | 45,170 | 196,470 |
| Rock bass | | | 5,300 | 5,300 |

*Stations and substations operated and the output of each, fiscal year 1936*—Contd.

| Stations, substations, and species | Eggs | Fry | Fingerlings | Totals |
|---|---|---|---|---|
| Marion, Ala.: | | | | |
| Black bass, largemouth | | 18,000 | 409,500 | 427,500 |
| Sunfish | | | 539,160 | 539,160 |
| Tupelo, Miss.: | | | | |
| Black bass, largemouth | | 89,000 | 272,500 | 361,500 |
| Sunfish | | | 190,025 | 190,025 |
| Nashua, N. H.: | | | | |
| Black bass, smallmouth | | | 1,750 | 1,750 |
| Brook trout | | | 180,625 | 180,625 |
| Catfish | | | 3,275 | 3,275 |
| Landlocked salmon | | | 19,500 | 19,500 |
| Rainbow trout | | | 4,530 | 4,530 |
| National Forest of N. H. (Berlin, N. H.): | | | | |
| Brook trout | 1,000,000 | 242,000 | 238,140 | 1,480,140 |
| St. Johnsbury, Vt.: | | | | |
| Black bass, smallmouth | | | 3,150 | 3,150 |
| Brook trout | | 544,500 | 226,180 | 770,680 |
| Landlocked salmon | | 67,500 | 59,640 | 127,140 |
| Neosho, Mo.: | | | | |
| Black bass, largemouth | | 170,000 | 76,930 | 246,930 |
| Crappie | | | 3,400 | 3,400 |
| Rainbow trout | 308,000 | | 38,670 | 346,670 |
| Rock bass | | | 4,925 | 4,925 |
| Sunfish | | | 24,550 | 24,550 |
| Natchitoches, La.: | | | | |
| Black bass, largemouth | | | 110,875 | 110,875 |
| Sunfish | | | 15,365 | 15,365 |
| Warmouth bass | | | 8,400 | 8,400 |
| Tishomingo, Okla.: | | | | |
| Black bass, largemouth | | | 139,555 | 139,555 |
| Catfish | | | 18,630 | 18,630 |
| Crappie | | | 77,205 | 77,205 |
| Sunfish | | | 170,910 | 170,910 |
| Warmouth bass | | | 25,700 | 25,700 |
| Northville, Mich.: | | | | |
| Black bass, largemouth | | | 6,600 | 6,600 |
| Black bass, smallmouth | | | 44,000 | 44,000 |
| Brook trout | | | 763,185 | 763,185 |
| Rainbow trout | | | 227,500 | 227,500 |
| Sunfish | | | 64,300 | 64,300 |
| Orangeburg, S. C.: | | | | |
| Black bass, largemouth | | 11,500 | 355,430 | 366,930 |
| Catfish | | | 1,720 | 1,720 |
| Crappie | | | 2,560 | 2,560 |
| Sunfish | | | 160,500 | 160,500 |
| Warmouth bass | | | 18,870 | 18,870 |
| Pittsford, Vt.: | | | | |
| Blackspotted trout | | | 7,100 | 7,100 |
| Brook trout | | | 57,260 | 57,260 |
| Grayling | | | 2,185 | 2,185 |
| Rainbow trout | | | 175,470 | 175,470 |
| Put in Bay, Ohio: | | | | |
| Pike perch | 548,480,000 | | | 548,480,000 |
| Whitefish | | 32,680,000 | | 32,680,000 |
| Quinault, Wash.: | | | | |
| Blackspotted trout | | | 367,500 | 367,500 |
| Brook trout | | | 217,200 | 217,200 |
| Chinook salmon | | 21,240 | 12,510 | 33,750 |
| Sockeye salmon | | 11,038,000 | 3,765,000 | 14,803,000 |
| Duckabush, Wash.: | | | | |
| Chum salmon | | 7,342,000 | | 7,342,000 |
| Silver salmon | | 70,700 | 92,700 | 163,400 |
| Quilcene, Wash.: | | | | |
| Blackspotted trout | | | 366,000 | 366,000 |
| Brook trout | | | 198,900 | 198,900 |
| Chum salmon | | 6,797,000 | 9,070 | 6,806,070 |
| Silver salmon | | 273,800 | 464,700 | 738,500 |
| Steelhead trout | | | 153,000 | 153,000 |
| San Marcos, Tex.: | | | | |
| Black bass, largemouth | | 34,000 | 151,060 | 185,060 |
| Crappie | | | 28,980 | 28,980 |
| Sunfish | | | 91,430 | 91,430 |
| Ft. Worth, Tex.: | | | | |
| Black bass, largemouth | | | 44,625 | 44,625 |
| Catfish | | | 6,050 | 6,050 |
| Crappie | | | 13,725 | 13,725 |
| Sunfish | | | 19,750 | 19,750 |
| San Angelo, Tex.: | | | | |
| Black bass, largemouth | | | 28,065 | 28,065 |
| Crappie | | | 13,100 | 13,100 |
| Sunfish | | | 4,000 | 4,000 |

*Stations and substations operated and the output of each, fiscal year 1936*—Contd.

| Stations, substations, and species | Eggs | Fry | Fingerlings | Totals |
|---|---|---|---|---|
| Saratoga, Wyo.: | | | | |
| Blackspotted trout | | | 510,100 | 510,100 |
| Brook trout | | | 953,720 | 953,720 |
| Loch Leven trout | | | 558,100 | 558,100 |
| Rainbow trout | | | 372,770 | 372,770 |
| Spearfish, S. Dak.: | | | | |
| Boackspotted trout | | | 85,320 | 85,320 |
| Brook trout | | | 847,000 | 847,000 |
| Grayling | | 90,000 | | 90,000 |
| Loch Leven trout | | | 236,700 | 236,700 |
| Rainbow trout | | | 630,450 | 630,450 |
| Springville, Utah: | | | | |
| Blackbass, largemouth | | | 2,515 | 2,515 |
| Blackspotted trout | | | 470,300 | 470,300 |
| Brook trout | | | 288,000 | 288,000 |
| Golden trout | | | 11,100 | 11,100 |
| Grayling | 125,000 | | 22,700 | 147,700 |
| Loch Leven trout | | | 334,000 | 334,000 |
| Rainbow trout | 500,160 | | 705,080 | 1,205,240 |
| Sunfish | | | 15,500 | 15,500 |
| Bear Lake, Utah: | | | | |
| Brook trout | | | 404,600 | 404,600 |
| Rainbow trout | | | 67,100 | 67,100 |
| Silver salmon | | | 124,100 | 124,100 |
| White Sulphur Springs, W. Va.: | | | | |
| Black bass, largemouth | | | 350 | 350 |
| Brook trout | | | 675,530 | 675,530 |
| Loch Leven trout | | | 383,450 | 383,450 |
| Rainbow trout | 405,000 | | 1,329,700 | 1,734,700 |
| Rock bass | | | 3,300 | 3,300 |
| Sunfish | | | 87,730 | 87,730 |
| Woods Hole, Mass.: | | | | |
| Flatfish | | 400,571,000 | | 400,571,000 |
| Mackerel | | 1,234,000 | | 1,234,000 |
| Wytheville, Va.: | | | | |
| Black bass, largemouth | | | 2,410 | 2,410 |
| Black bass, smallmouth | | | 3,560 | 3,560 |
| Brook trout | | | 335,530 | 335,530 |
| Rainbow trout | 1,550,000 | | 743,500 | 2,293,500 |
| Rock bass | | | 23,620 | 23,620 |
| Sunfish | | | 54,900 | 54,900 |
| Harrison Lake, Va.: | | | | |
| Black bass, largemouth | | 86,000 | 10,200 | 96,200 |
| Yellowstone Park, Wyo.: | | | | |
| Blackspotted trout | 9,696,000 | | 5,280,000 | 14,976.000 |
| Grayling | 225,000 | 4,810,500 | | 5,035,500 |
| Moose, Wyo.: | | | | |
| Blackspotted trout | | 43,500 | 530,420 | 573,920 |
| Brook trout | | | 63,150 | 63,150 |

## EGG COLLECTIONS

As might be expected the increase in the collection of eggs was roughly proportional to the augmented output of the species which are incubated artificially. The Bureau's egg supply is obtainable from three sources: Trout eggs are obtained from a brood stock maintained at the hatcheries or by collections from wild fish captured during their spawning migrations. The second source, and the greatest numerically, is the activities of the commercial fishermen, which yields eggs of such varieties as shad, cod, haddock, whitefish, pike perch, and lake trout. The eggs of the Pacific salmon are obtained in still a different manner, being taken by the Bureau's employees as the fish approach the spawning grounds after having eluded the nets and traps of the commercial fishermen. Many of the eggs, therefore, are in the nature of a byproduct.

*Comparison of egg collections, fiscal years 1935 and 1936*

| Species | 1935 | 1936 | Species | 1935 | 1936 |
|---|---|---|---|---|---|
| Shad | 5,280,000 | 22,128,000 | Pike perch | 519,075,000 | 536,845,000 |
| Whitefish | 54,895,000 | 59,970,000 | Yellow perch | 14,000,000 | 324,166,000 |
| Chinook salmon | 29,919,000 | 75,282,000 | White perch | 2,400,000 | ---------- |
| Chum salmon | 21,138,000 | 19,703,000 | Cod | 1,753,129,000 | 3,956,886,000 |
| Silver salmon | 3,398,000 | 4,487,000 | Haddock | 264,483,000 | 430,109,000 |
| Sockeye salmon | 3,326,000 | 16,262,000 | Pollock | 523,622,000 | 1,462,985,000 |
| Steelhead trout | 1,352,000 | 2,547,000 | Flounder | 1,375,129,000 | 1,634,507,000 |
| Rainbow trout | 21,365,920 | 24,154,000 | Mackerel | 2,800,000 | 1,796,000 |
| Blackspotted trout | 21,206,000 | 40,879,000 | Lake herring | 5,520,000 | 6,760,000 |
| Lock Leven trout | 30,372,000 | 15,757,000 | Carp | 83,250,000 | 1,500,000 |
| Lake trout | 2,684,000 | 1,578,500 | Buffalofish | 214,046,000 | 13,912,000 |
| Brook trout | 29,265,500 | 27,128,800 | Total | 4,981,655,420 | 8,683,260,500 |
| Grayling | ---------- | 3,918,000 | | | |

## NOTES ON OPERATIONS

### COMMERCIAL SPECIES

*Pacific salmon.*—Headquarters for the work in both the Pacific Coast States and the Rocky Mountain section were transferred to Seattle, Wash., at the start of the fiscal year. The propagation of the Pacific salmons yielded much better results than during the previous year. A noticeable increase in the two most valuable species, the chinook salmon and the sockeye salmon, was registered. No pink salmon were propagated and the chum variety was handled in smaller numbers.

The augmented output of chinook salmon was due to a record run of fish at the Big and Little White Salmon, Wash., substations. Collections were made to the full capacity of these establishments and enough fish were available to yield a collection of approximately 45,000,000 eggs. It is particularly important to increase the production of this variety, due to the changes which will occur in the Columbia River following the completion of the Bonneville Dam. In fact, these two stations will be partly flooded when the dam is completed and plans are being made for their relocation at other points where the work can be continued with the same efficiency and trout may be handled in addition.

The facilities of the main station at Clackamas, Oreg., were improved by the action of the State of Oregon in transferring to the Bureau the hatchery property located at Delph Creek, a few miles away. This will be used to rear trout and salmon during the summer months when the water supply at the station is inadequate. The fish cultural work at Clackamas proceeded along normal lines otherwise. The station is constantly increasing its production of game trout, however.

In the California field no effort was made to collect eggs at the Baird station due to the uncertain results and the cost involved. A million and a half chinook salmon eggs were transferred for incubation from the Battle Creek substation. Total collections at that point amounted to 8,500,000, approximating a normal take under existing conditions. At the Mill Creek substation egg collections amounted to 4,500,000.

In the Olympic Peninsula the output of sockeye from the Quinault, Wash., station again resumed normal proportions, approximating 13,000,000. Some new rearing ponds were constructed by E. C. W.

labor. Here, too, the output of trout was increased in conformity with the program of augmenting the production of game fish at these salmon hatcheries.

The two substations located at Duckabush and Quilcene, Wash., concentrated on the propagation of chum salmon. A large number of these eggs are easily obtainable and are incubated at both stations. The most important factor here was the construction of a fish food dehydrating plant at Quilcene. This is used in preparing fish meal from the spawned-out chum salmon, and a considerable quantity of this material was turned out at a cost of approximately 4½ cents per pound. The salmon propagation is likewise being supplemented by concentrating on the production of game trout during the summer months.

At the Birdsview, Wash., station, the total egg collections were almost four times as great as during the previous year. Almost a million trout eggs of various species were incubated. However, the run of steelhead was noticeably below the level of previous years. Experiments in the marking of sockeye salmon fingerlings were continued and numerous returns are being secured from the fish which were marked, commencing in the fall of 1929.

The Baker Lake station operated only for the purpose of incubating trout eggs during the summer months. However, it was reported that the run of sockeye and silver salmon in the Baker River was the largest for a number of years.

While the two additional substations under the administration of the Birdsview station are concerned entirely with the propagation of trout, it is appropriate to mention that the Mount Rainier substation has now been developed to the point where it is an important factor in maintaining the stock of fish in the park and in the adjoining National Forest areas. Efforts are being made to collect eggs of the cut-throat trout from certain lakes in the park which had been previously stocked with this object in mind.

The other establishment, a series of rearing ponds outside of the city of Spokane, Wash., was placed in operation during the year. Over 500,000 trout and graylings ranging up to 6 inches in size were distributed.

### MARINE SPECIES

It has been mentioned elsewhere that there was general expansion of activities at the three New England hatcheries engaged in propagating cod, haddock, pollock, and other varieties supporting the inshore commercial fisheries.

At Gloucester, Mass., a considerable number of spawn-takers were placed aboard local fishing vessels and a tremendous number of pollock eggs were fertilized and planted by this means. Of the 3,000,000,000 cod eggs secured, slightly over 300,000 were propagated at the hatchery, the balance being planted after fertilization on the spawning grounds. Haddock work was relatively unsuccessful at this point. Some propagation of lobster was resumed on an experimental basis. Considerable work was required during the year in the maintenance of the property and equipment due to deterioration during the period of closure.

A Diesel-powered launch was transferred from the Cape Vincent, N. Y., station to Gloucester as a tender.

The Woods Hole, Mass., station made no attempt to propagate cod, and its operations with the winter flounder were seriously hampered by the severe winter. A considerable proportion of the 400,000,000 fry hatched were distributed in the waters of Long Island Sound. The personnel of this station has as usual expended considerable effort in maintenance of the extensive plant, also in assisting in the laboratory work conducted by the Division of Scientific Inquiry during the summer.

At the Boothbay Harbor, Maine, station, following the installation of a new electric pump, considerable overhauling and changing of the piping system was necessary. Severe winter conditions also affected the propagation of flat fish or flounder during the early part of the season. Later results were more favorable, yielding a production of 1,000,000,000 fry. The propagation of cod exceeded that of the previous year. Haddock operations were a minor activity in connection with other major work.

For some years there has been frequent expression of doubt as to the exact value of propagating marine species. This activity is now increasing in popularity and if carried on as an adjunct to commercial fishing operations and not as an end in itself, it appears highly justifiable.

### GREAT LAKES SPECIES

With the exception of the Put in Bay, Ohio, station, the handling of the commercial species of the Great Lakes is at a low ebb. Changes in the fishing season in Michigan waters several years ago virtually eliminated the production of whitefish and lake trout at the Michigan hatcheries and at the Duluth, Minn., station.

At the Cape Vincent, N. Y., station, changes in the spawning habits of the fish, particularly concentration in Canadian waters, have greatly reduced the potential egg supply. Consequently, these stations have either been closed or are emphasizing the production of game fish, the commercial varieties being handled as a side line.

The Duluth, Minn., station handled less than a million lake trout and whitefish eggs, but incubated a considerable number of game trout eggs for transfer to rearing stations in the national forests.

During the spring, in cooperation with the State of Minnesota, approximately 10,000,000 pike perch were hatched.

The Put in Bay, Ohio, operations are on a joint basis with the State of Ohio. The Bureau is supervising the collection of the eggs at designated areas and the hatching is being carried on in the nearby State hatchery with the assistance of the Bureau's personnel. The Federal hatchery, however, is maintained in readiness to handle any excess quantity of eggs which might be beyond the capacity of the State establishment. Our egg collections for the year exceeded 52,000,000 whitefish and 500,000,000 pike perch.

The activities of the Cape Vincent, N. Y., station, as regards propagation of game fish and operations of its substations, will be discussed elsewhere in this report. An output of whitefish and lake herring slightly better than last year was obtained. Over 1,000,000 lake trout eggs were also secured from local fishermen. The production at this point could be moderately increased were funds available for the hiring of an adequate number of spawn-takers.

### ANADROMOUS SPECIES OF THE ATLANTIC COAST

Atlantic salmon, yellow perch, and shad are the varieties which are propagated for the maintenance of fisheries in the rivers of the East coast. It was possible to obtain from the Canadian Government 1,500,000 Atlantic salmon eggs in comparison with the usual assignment of only 1,000,000. Two-thirds of these were assigned to various hatcheries operated by the State of Maine in conformity with an agreement covering this work. The State attended to the major part of the distribution of the resulting fry and fingerlings. Gratifying reports were received as to the run of salmon in the Penobscot River, and the improvements being made to the fish ways in this river encourage the belief that conditions will be even better in the future.

At the Fort Belvoir, Va., hatchery on the Potomac River, the main activities with shad were conducted. The take of eggs and production of fry were slightly greater than during the previous year. Funds were available to permit the resumption of hatching yellow perch and over 400,000,000 fry of this species were planted locally at very slight cost.

The Edenton, N. C., station likewise reported slightly better results with the shad, taking 4,750,000 eggs. The rigorous winter prevented the collection of yellow perch brood stock at the time when they were spawning and there was consequently no production of this species, or of the white perch. Increasing difficulty is being met in securing shad eggs here because of the fact that the commercial fishery is centered further down in Albemarle Sound and the fish are not ripe when taken. The Edenton station carries on considerable propagation of pond fish, supplementing its work with the commercial varieties.

The cooperative work with the State of South Carolina, whereby the Orangeburg, S. C., station propagates shad at Jacksonboro, was continued, but results failed to meet expectations. Slightly less than 1,000,000 fry were produced, the work being seriously hampered by floods during the spawning season. Special attention is being given to the experimental rearing of shad, and a number of the fry were held in ponds at the close of the year.

### GAME FISH PROPAGATION

There was a moderate increase in the output of game fish produced in the interior hatcheries. Some confusion exists as to the exact status of these hatcheries, since the rapid expansion of State fish cultural activities has raised the question of duplication or competition with the Federal hatcheries. The fact is, the demand for game fish is greatly in excess of all current facilities for producing them. Should the Bureau discontinue entirely the stocking of all waters except those directly under Federal jurisdiction, there would still be an outlet for the entire production of all but a half-dozen of the Federal hatcheries in the interior. National parks, national forests, Resettlement projects, the Tennessee Valley Authority, and similar Federal projects constitute a definite obligation upon practically all of the existing hatcheries and present a need for new hatcheries, or at least additional rearing facilities.

The trend toward rearing game fish to larger size before stocking has been recognized, but the continued high cost of fish food has pre-

sented a real obstacle to the full accomplishment of this objective.

The cooperation of applicants, States, and other Federal agencies in distributing the fish has released greatly needed funds to be applied to production.

There follows a brief outline of the nature and scope of game fish propagation in the various geographical sections.

### ROCKY MOUNTAIN TERRITORY

Activities at the Yellowstone Park, Wyo., station overlap the end of the fiscal year and consequently seasonal reports are based upon parts of two fiscal years. For the season of 1934 the egg collections totaled over 30,000,000, somewhat less than during the previous year. The reduction was due chiefly to high water which made it impossible to maintain all of the traps throughout the season. There was a slight decrease in the collection of grayling eggs. Of the total trout egg collection, 65 percent were used to restock Park waters, in comparison with the 60 percent which is the basis of the agreement with the Park Service covering these operations.

Conditions at the Jackson Hole, Wyo., substation serving the Teton National Park were unsatisfactory. An undue amount of disease was encountered and at the close of the fiscal year preparations were being made to transfer the hatchery to a new site on Government owned land under the jurisdiction of the United States Forest Service, where a superior water supply will be available. Efforts are being made to secure local egg-collecting facilities at one of the lakes in that territory. An unusual feature here is the use of elk meat for fish food. This meat is secured from animals which are culled out of the herd due to age, weakened condition, etc.

The Spearfish, S. Dak., station enjoyed a very successful year, having distributed a large number of 3- and 4-inch fingerlings to private applicants and to the United States Forest Service. Among the improvements the major item is the construction of a stone garage as a W. P. A. project. The station was equipped with a new distribution truck. At the close of the year arrangements were being made for the construction of a new hatchery building, this, also, to constitute a W. P. A. project.

Operations at the Glacier Park hatchery were comparable to former years but considerable difficulty was experienced in the water supply system, which repeatedly was clogged with gravel. The necessity for a new and improved hatchery for Glacier Park is realized, and an alternative location is under consideration, but development will necessarily await the securing of an appropriation for purchase of the site and for the construction work.

The Saratoga, Wyo., station made a very satisfactory showing, both in the distribution of fingerlings and in the take of eggs from station brood stock. Some work was performed in improving the station ponds and grounds through C. C. C. detail.

In Colorado the work of the substation at Creede is fast becoming of importance equal to that of the older establishment at Leadville. The latter station distributed over 3,800,000 trout and handled a much larger number of eggs. Egg collections at Lake San Cristobal in the Creede territory represented an increase, 2,500,000 brook trout eggs and 750,000 rainbows having been secured. These eggs are of unusually high quality, 97 percent to 99 percent reaching the eyed stage.

A new dwelling has been made ready for occupancy at the Creede station.

An average production of trout and trout eggs was obtained at the Springville, Utah, station, and in addition thereto a few bass and bream were propagated. The number of fish handled at the Bear Lake, Utah, substation was reduced by about 50 percent, in the belief that a reduction of crowding would relieve the mortality. This was found to be the case and a very creditable output achieved in spite of the smaller number of eggs handled.

The important work in the Montana territory was centered at the Bozeman station, where a duplex dwelling was completed. Several rearing ponds were constructed and improvements made to the station's water supply. Shipments of trout eggs amounted to almost 10,000,000, and 2,800,000 fingerlings were distributed.

In the Madison Valley adverse weather conditions caused an early cessation of Loch Leven egg collections and the take of 14,000,000 was 10,000,000 less than during the previous year. However, collections of spring rainbow eggs were increased. One-half mile of telephone line was constructed for the purpose of affording this substation outside connections.

At the Miles City, Mont., substation devoted to the propagation of warm water fish, 350,000 fingerlings of various species were produced. The production of fingerling bass was approximately 50,000 over that of last year.

A liberal grant of W. P. A. labor at the Hagerman, Idaho, station permitted extensive repairs and improvements, including the construction of ponds and general improvements to the buildings. A very large percentage of the fingerling trout used at this station are from 3 to 6 inches in length when liberated. Rainbow trout eggs are now being obtained from brood stock produced at the station.

The Salmon, Idaho, station was operated jointly with the State of Idaho and served as a base for rainbow egg collection operations at Williams Lake. Over 3,000,000 were secured from this source and the hatching and rearing was handled at the above-mentioned hatchery. Four rearing ponds were built on state property adjoining this establishment.

The Dexter, N. Mex., station is in an entirely different category than other stations in the Rocky Mountain territory due to the fact that it propagates warm-water fish exclusively. Heavy losses of brood stock from the depredations of fish-eating birds affected the production somewhat. However, there was a good hatch of bass which made it possible to distribute 200,000 fingerlings in June and still reserve an adequate number for later distribution.

### NEW ENGLAND STATIONS

With the increasing importance of New England as a vacation center the pressure upon the game fish hatcheries in that section is increasing. In Maine the Craig Brook station handled a slightly smaller number of brook trout due to a reduction in the brood stock. The State of Maine also made a reduced allotment of landlocked salmon eggs, furnishing only 100,000. Work with the Atlantic salmon is discussed elsewhere. Considerable trouble was experienced during the year with the water supply dam providing the main supply for the hatchery and a break late in May necessitated complete rebuilding. Arrangements were formulated with the National Park Service

whereby that agency will assign C. C. C. labor for the construction of a number of rearing ponds on the station property. These will be used to rear fish exclusively for the waters of the Acadia National Park. It is expected that a number of other improvements will be effected in connection with this program.

The Nashua, N. H., station was subjected to the ravages of the spring floods which virtually wiped out the supply of trout fingerlings on hand. The entire hatchery reservation was flooded and while a few fish were salvaged it was necessary to ship in brook trout fry from other hatcheries in order to secure a greatly reduced output of fish for distribution.

The St. Johnsbury, Vt., and York Pond, N. H., stations were separated administratively, the former being now independent of the field operations at York Pond. At St. Johnsbury unusually good results were obtained in the rearing of landlocked salmon from eggs supplied by the State; 65,000 yearlings were produced, some of them reaching 9 inches in length. The output of brook trout was curtailed due to the poor quality of the eggs transferred from York Pond. Considerable improvements were attempted by W. P. A. allotment. The foundations of several of the buildings were repaired, painting was done, and the drain line to the ponds was renewed. A new heating plant was installed in the hatchery building.

At York Pond there was a combination of unfavorable circumstances which caused a heavy loss of brook trout brood stock, followed by an outbreak of the "soft egg" disease, which makes sporadic appearance, particularly in the New England hatcheries. In consequence the output of fry and fingerlings at this station was below normal and shipments of eggs to other hatcheries produced very unsatisfactory results. The development program continued by virtue of C. C. C. labor and a W. P. A. project. The pond system has been improved and a new well furnishing 100 gallons per minute was developed. The water supply canal to the power-house has been virtually rebuilt. A large ice storage building was constructed, and numerous minor improvements all contributing to the efficiency of the plant have been completed. Experiments in determining cheaper fish foods presented some interesting information but no definite conclusions have been reached as yet.

At the Hartsville, Mass., station operations were of a routine nature with the exception that unusually favorable results were obtained in the collection of smallmouth bass fry in Connecticut, in cooperation with the State Board of Fisheries and Game. Over 840,000 fry were handled. The collection of brook trout eggs from station stock amounted to over 400,000 and a considerable number of excellent fingerlings, ranging up to 6 inches in length, were placed in local waters. No significant improvements or expansions could be carried on during the year.

### COMBINATION TROUT AND POND-FISH STATIONS

Most of the establishments in this category are primarily concerned with the propagation of trout, and the production of warm water pond fish is a side line or by-product. At the Manchester, Iowa, station the year's operations were of normal extent. The station brood stock yielded over 2,000,000 rainbow trout eggs and the eggs of other species shipped in produced a quantity of fingerlings adequate for all

requirements in that section. The output of smallmouth bass was reduced as to numbers but included a considerable proportion of larger fish. The fish culturist's residence, gutted by fire during the previous year, was rebuilt.

The incomplete status of the pond development program at the Flintville, Tenn., station served to limit the production at that point. Trout of two varieties were produced in numbers fully sufficient to meet requirements in that territory but the inadequate pond space and insufficient brood stock of warm-water varieties was reflected in a negligible production, particularly of bass.

The Neosho, Mo., station reports an unusually favorable season, the sole serious handicap being the loss of several hundred rainbow brood stock due to the severing of a water supply pipe line during road repairs. Attacks of disease were negligible among the rainbow trout. Studies in selective breeding as well as experiments with fish foods were among the important activities at Neosho. Largemouth bass were produced in much greater quantities than during the previous year.

At the Bourbon, Mo., substation, operated on a cooperative basis for the sole purpose of producing rainbow eggs, there was a definite increase in the yield.

The scientific and investigative activities of the Leetown, W. Va., station are the subject of report elsewhere. So far as productive fish cultural work is concerned, the station handled over 2,750,000 trout eggs. Abnormal losses were experienced both among the eggs and fry, due to conditions which have not been satisfactorily determined. Many of the fingerling trout were used in restocking the national forest areas in Virginia and West Virginia. The station bass cultural operations were fairly successful with the production of over 30,000 smallmouth fingerlings in spite of the fact that the ponds were new and leaked badly. A set of raceways were provided with a concrete lining in order to prevent damage to surrounding property through seepage.

The White Sulphur Springs, W. Va., station functioned in a normal manner, cooperating extensively with the State of West Virginia.

The demonstration hatchery conducted jointly by the Bureau and Monroe County, N. Y., near the city of Rochester produced a very satisfactory output of trout fingerlings used extensively in stocking the waters under the control of the county park authorities. A few thousand bass were also obtained.

The Cape Vincent, N. Y., station, together with its substations at Cortland, Watertown, and Barneveld contributed heavily toward the restocking of the trout waters in northern and central New York. Approximately 50,000 smallmouth bass fingerlings were produced in the four acres of ponds available for this purpose.

The most outstanding feature in connection with the work of the Northville, Mich., station was the excellent results obtained at the various cooperative rearing stations maintained during the summer months under the direction of this station. Over 50,000 bass were also produced at Northville, with larger numbers of bream.

The Wytheville, Va., station was the source of a large number of rainbow trout which were used in stocking forest service and national park waters in that territory. The collection of rainbow eggs amounted approximately to 2,500,000. The production of pond fish here was insignificant. Supervised by the superintendent of the Wytheville

station, the construction of the new hatchery in the Smoky Mountain National Park proceeded rather slowly due to its isolated location and other factors. At the close of the year the National Park Service had constructed 17 rearing pools and the water supply system had been installed. A hatchery building and a service building were about two-thirds completed and work was progressing on the construction of a residence. In spite of the incomplete status of the project it was possible to handle rainbow trout fingerlings in the rearing ponds during the latter part of the year.

The Lamar, Pa., hatchery received brook and rainbow trout fingerlings transferred from other establishments and reared them over the summer months for fall distribution. Development work has consisted in the construction of additional circular rearing pools, the work being performed by C. C. C. detail.

### POND-FISH STATIONS

The majority of these establishments located in the southeastern and south central sections maintained previous records of output and in some instances materially bettered the production of last year. The Mammoth Spring, Ark., station supplied a much larger proportion of its production of bass to the waters of the National Forests in Arkansas and Missouri. 100,000 bass fry were transferred to the State hatchery at Lonoke on a cooperative rearing basis.

The Department of Fish and Game of the State of Georgia assumed full responsibility for the distribution of fish produced at both of the Bureau's Georgia stations. At the Lake Park, Ga., substation the initial use of a new water supply permitted the handling of the propagating pond to much better advantage. However, the actual distribution of fish during the fiscal year 1936 was slight due to the fact that construction work had been under way during the greater part of the year. Conditions at the close of the fiscal year indicated a very satisfactory production during the pending distribution season. W. P. A. labor was largely employed in effecting the foregoing improvements and in maintaining the station property.

The new Harrison Lake, Va., station was on a full productive basis during the year, utilizing 12 large ponds and several small minnow and daphnia ponds. Almost 100,000 bass had been distributed by the close of the year, with a considerable number of fingerlings remaining, as well as a good stock of bream. Severe rains necessitated considerable repair work where the new pond embankments had become eroded. Brood stock was obtained from Harrison Lake which is used as the water supply for the hatchery.

The Tupelo, Miss., station escaped damage from the terrific tornado which visited that section and produced an output of bass approaching previous high records for this hatchery. The production of bream was somewhat reduced, however, due to consumption of the bream fry and fingerlings by the bass.

Inadequacy of brood stock curtailed the production of smallmouth and largemouth bass at the Louisville, Ky., station below the normal average. However, the output was in excess of the previous year. Relief labor is employed extensively at this point in improving the pond system, including the closure of leaks and the renewal of drain and supply lines.

No construction work of any importance was carried on at the Marion, Ala., station, but the output of bass was increased more than 100 percent over last year. A total of over 500,000 bass were handled which, together with the bream, constituted a hatch of more than 1,000,000 total. An unusually good growth was obtained for the bream, a number being 4 inches in length when distributed. Some research work was conducted through the assignment of an investigator to the Marion station but conditions were found to be unsatisfactory for this activity and the program was discontinued at the close of the year.

The Edenton, N. C., station doubled its output of bream and attained a normal yield of bass.

By thorough cleaning of the brood ponds the production at the Orangeburg, S. C., station was increased by approximately 125,000 fish. The removal of the profuse vegetation was most effective in securing this result. The superintendent cooperated in the development of a small auxiliary located a few miles from the main station.

In Texas both of the older stations, located at San Marcos and at Forth Worth, operated in a normal manner with average results. No major changes or improvements were effected. At the new San Angelo, Tex., establishment fish were reared for the first time. Fry were transferred from Fort Worth and San Marcos and reared during the summer months, the total distribution amounting to 47,000 fish.

Work at the new Uvalde, Tex., substation was actively under way from September to the close of the year. The accomplishments included partial completion of two residence buildings, garage, holding shed, and store room. An office and shop building was completed. Nine ponds were virtually finished and a number of others carried well along. A considerable amount of clearing was accomplished; roads and walks were constructed and a pump installed to provide the water supply from a driven well.

At the Natchitoches, La., station a W. P. A. project was perfected and work was started on the development of additional ponds. Six new ponds, each of 2 acres area, were completed. The production of fish was much more extensive than during previous years.

The Tishomingo, Okla., station likewise surpassed the production of the previous year. An interesting feature of the work here was the production of channel catfish.

### MISSISSIPPI RIVER TERRITORY

The headquarters for the work in the Mississippi Valley located at La Crosse, Wis., is the center for a number of varied activities. During the past year in addition to the hatching and distributing of over 1,000,000 trout, the La Crosse station supervised the salvage of over 47,000,000 fish from the overflow pools in the Upper Mississippi Wild Life Refuge.

Attention should again be called to the fact that upon completion of the 9-foot channel project the characteristics of the pools to be formed will be such that the rescue work will recede to approximately 5 percent of its present proportions. Greater attention is being given to the establishment of controlled, propagating ponds to provide a source of fish in lieu of the salvaged stock. Three of such ponds were operated during the year, and construction is under way at an addi-

tional one. Plans have already been prepared for additional ponds to be constructed as W. P. A. projects, with an ultimate objective of over 400 acres under water.

The Homer, Minn., station was continued in operation as a base for rescue work, and also as a center for overhauling and repairing equipment, boats, trucks, etc.

A limited amount of W. P. A. work was performed at the Lake Mills, Wis., station, resulting in some improvements to the ponds and grounds. An unfavorable spawning season apparently reduced the production of pond fish, less than 50,000 having been secured. Several hundred thousand trout were produced for stocking waters which can be most readily served from this hatchery.

At the Rochester, Ind., station, work was under way during the greater part of the year on the construction of additional ponds as a W. P. A. project. Three ponds were carried to various stages of completion. A fairly successful production of bass and other species was secured and distributed by the State of Indiana. At the same time an auxiliary station at Argos, about 20 miles from Rochester, was being developed, likewise under W. P. A. auspices. This will comprise 5 ponds fed by flowing wells, and 1 building. The drought affected the water supply at the Rochester station necessitating a distribution of the fish earlier than would be preferred.

Activities at the Fairport, Iowa, station were along routine lines, with the production of pond fish running close to normal. In addition some 900,000 fish were salvaged from nearby, overflowed areas, and carp and buffalo eggs were obtained from nearby commercial fisheries and were replanted in local waters after fertilization.

## AQUARIUM

The Bureau of Fisheries Aquarium is located under the main lobby of the Department of Commerce Building.

Its display consists of about 1,600 specimens of some 54 species of aquatic animals. Stress is laid particularly on the fresh water game and food fish, and on the most common predators. The greatest single attraction was the seasonal miniature hatchery. Biology students in and near Washington made regular visits when the eggs were hatching.

Cooperation with other public aquaria in the exchange and supply of specimens was a feature of the work. The Aquarium was used as a base for the distribution of fish for the stocking of public waters. A special effort was made to develop more natural habitat conditions in the decoration of the tanks. Considerable success was achieved in the study and control of surface parasites on fish which seemed especially prevalent in this territory this season.

The aquarium has, in brief, served as a most interesting show room or "sample room" for demonstrating the products of the Bureau's hatcheries.

## DISTRIBUTION OPERATIONS

The number of applications supplied this year shows a considerable increase over 1935, which is probably accounted for largely by the growing use of trucks for making deliveries. Truck mileage was nearly double that of the previous year.

The distribution cars engaged in the delivery of fish to applicants and transfers between hatcheries this year made 75 trips and carried

an average of 250 pails per trip. The cars traveled 48,014 paid miles and 7,329 free miles in delivering fish to applicants. Detached messengers made 56,064 paid miles and 8,404 free miles. Truck deliveries covered 81,009 miles, the trucks being used for short trips and the cars for longer hauls. As usual, the Bureau received free transportation and reduced rates from a number of railroads.

Owing to the prevailing limited funds for distribution purposes, the practice of asking applicants to call at the hatcheries if possible, to receive their fish had to be continued. Upon their failure to do so the applications which could not be filled by messenger were carried over for another attempt to make delivery the following season.

*Summary, by States, of the distribution of fish, fiscal year 1936*

| State and species | Number |
|---|---|
| Alabama: | |
| Largemouth black bass | 415, 657 |
| Sunfish | 452, 885 |
| Catfish | 140 |
| Lochleven trout | 51, 000 |
| Arizona: | |
| Black bass | 3, 840 |
| Sunfish | 15, 960 |
| Arkansas: | |
| Largemouth black bass | 144, 450 |
| Smallmouth black bass | 197, 725 |
| Rock bass | 11, 000 |
| Sunfish | 68, 825 |
| Rainbow trout | 900 |
| California: Chinook salmon | 10, 572, 413 |
| Colorado: | |
| Largemouth black bass | 15, 000 |
| Rock bass | 5, 600 |
| Crappie | 4, 000 |
| Catfish | 28, 000 |
| Brook trout | 4, 519, 610 |
| Rainbow trout | 1, 349, 544 |
| Blackspotted trout | 1, 200, 000 |
| Lochleven trout | 329, 520 |
| Connecticut: | |
| Smallmouth black bass | 315, 200 |
| Rainbow trout | 9, 000 |
| Brook trout | 3, 000 |
| Delaware: | |
| Largemouth black bass | 9, 290 |
| Crappie | 5, 100 |
| Sunfish | 8, 375 |
| District of Columbia: Largemouth black bass | 15 |
| Florida: Sunfish | 2, 375 |
| Georgia: | |
| Largemouth black bass | 297, 227 |
| Smallmouth black bass | 81, 125 |
| Catfish | 8, 339 |
| Sunfish | 749, 950 |
| Brook trout | 6, 500 |
| Rainbow trout | 26, 390 |
| Idaho: | |
| Sunfish | 7, 700 |
| Brook trout | 62, 735 |
| Rainbow trout | 1, 423, 450 |
| Blackspotted trout | 1, 672, 580 |
| Lochleven trout | 52, 000 |
| Steelhead trout | 46, 500 |
| Illinois: | |
| Largemouth black bass | 31, 525 |
| Buffalo fish | 5, 825 |
| Carp | 4, 500 |
| Catfish | 20, 735 |
| Crappie | 54, 550 |
| Sunfish | 57, 225 |
| Yellow perch | 1, 600 |
| Lochleven trout | 6, 000 |
| Indiana: | |
| Largemouth black bass | 88, 535 |
| Smallmouth black bass | 48, 200 |
| Rock bass | 22, 000 |
| Crappie | 1, 825 |
| Indiana—Continued. | |
| Sunfish | 310, 520 |
| Catfish | 12, 400 |
| Yellow perch | 8, 600 |
| Brook trout | 89, 300 |
| Rainbow trout | 89, 850 |
| Lochleven trout | 292, 600 |
| Iowa: | |
| Largemouth black bass | 194, 245 |
| Smallmouth black bass | 9, 110 |
| White bass | 10, 300 |
| Crappie | 9, 670, 485 |
| Catfish | 3, 728, 750 |
| Sunfish | 8, 698, 300 |
| Buffalo fish | 1, 101, 400 |
| Drum | 1, 444 |
| Yellow perch | 88, 319 |
| Pike and pickerel | 45, 102 |
| Brook trout | 92, 900 |
| Rainbow trout | 1, 170 |
| Kansas: | |
| Largemouth black bass | 4, 850 |
| Rock bass | 1, 880 |
| Catfish | 2, 000 |
| Sunfish | 5, 200 |
| Rainbow trout | 1, 025 |
| Kentucky: | |
| Largemouth black bass | 21, 275 |
| Smallmouth black bass | 78, 510 |
| Rock bass | 4, 510 |
| Crappie | 250 |
| Sunfish | 2, 800 |
| Louisiana: | |
| Largemouth black bass | 213, 504 |
| Warmouth bass | 8, 400 |
| Sunfish | 14, 538 |
| Maine: | |
| Smallmouth black bass | 66, 100 |
| Brook trout | 968, 002 |
| Landlocked salmon | 404, 500 |
| Atlantic Salmon | 578, 000 |
| Flounder | 1, 015, 200, 000 |
| Maryland: | |
| Largemouth black bass | 4, 379 |
| Smallmouth black bass | 7, 977 |
| Sunfish | 53, 915 |
| Brook trout | 21, 932 |
| Rainbow trout | 11, 410 |
| Lochleven trout | 15, 700 |
| Chinook salmon | 2, 400 |
| Silver salmon | 3, 000 |
| Massachusetts: | |
| Smallmouth black bass | 239, 290 |
| Catfish | 1, 800 |
| Brook trout | 129, 657 |
| Rainbow trout | 1, 530 |
| Lochleven trout | 10, 000 |
| Landlocked salmon | 6, 000 |
| Cod | 261, 662, 000 |
| Flounder | 283, 619, 000 |
| Haddock | 9, 588, 000 |
| Pollock | 475, 457, 700 |
| Mackerel | 767, 000 |

*Summary, by States, of the distribution of fish, fiscal year 1936*—Continued

| State and species | Number |
|---|---|
| Michigan: | |
| Largemouth black bass | 7,995 |
| Smallmouth black bass | 40,050 |
| Rock bass | 2,650 |
| Sunfish | 77,500 |
| Brook trout | 1,326,375 |
| Rainbow trout | 357,702 |
| Lake trout | 192,500 |
| Minnesota: | |
| Largemouth black bass | 218,175 |
| Smallmouth black bass | 1,310 |
| Crappie | 1,763,100 |
| Sunfish | 1,002,335 |
| Catfish | 75,800 |
| Carp | 12,000 |
| Drum | 1,900 |
| Pike perch | 9,670,000 |
| Yellow perch | 4,184 |
| Pike and pickerel | 404,150 |
| Buffalofish | 100 |
| White bass | 2,400 |
| Whitefish | 1,275,000 |
| Brook trout | 221,200 |
| Rainbow trout | 70,550 |
| Lochleven trout | 71,600 |
| Lake trout | 64,000 |
| Miscellaneous fishes | 508,000 |
| Mississippi: | |
| Largemouth black bass | 323,865 |
| Sunfish | 189,875 |
| Missouri: | |
| Largemouth black bass | 210,235 |
| Smallmouth black bass | 35,140 |
| Rock bass | 17,195 |
| Crappie | 7,600 |
| Sunfish | 31,300 |
| Catfish | 1,125 |
| Rainbow trout | 35,795 |
| Montana: | |
| Largemouth black bass | 50,628 |
| Crappie | 3,200 |
| Sunfish | 25,720 |
| Catfish | 3,200 |
| Yellow perch | 18,718 |
| Blackspotted trout | 1,059,120 |
| Brook trout | 279,335 |
| Rainbow trout | 1,072,895 |
| Lochleven trout | 3,850,160 |
| Nebraska: | |
| Largemouth black bass | 24,425 |
| Rock bass | 3,500 |
| Crappie | 30,125 |
| Sunfish | 2,100 |
| Catfish | 4,500 |
| Brook trout | 217,150 |
| Rainbow trout | 214,510 |
| Lochleven trout | 151,500 |
| Nevada: | |
| Brook trout | 52,000 |
| Rainbow trout | 74,000 |
| Lochleven trout | 40,000 |
| New Hampshire: | |
| Smallmouth black bass | 41,150 |
| Catfish | 2,625 |
| Brook trout | 900,644 |
| Rainbow trout | 2,000 |
| Landlocked salmon | 13,500 |
| New Jersey: | |
| Largemouth black bass | 8,500 |
| Smallmouth black bass | 300 |
| Crappie | 750 |
| Sunfish | 3,100 |
| Catfish | 600 |
| Yellow perch | 450 |
| Brook trout | 2,100 |
| Rainbow trout | 5,520 |
| New Mexico: | |
| Largemouth black bass | 351,140 |
| Crappie | 6,900 |
| Sunfish | 79,875 |
| Catfish | 21,055 |
| New Mexico—Continued. | |
| Blackspotted trout | 55,000 |
| Brook trout | 16,000 |
| Rainbow trout | 239,000 |
| New York: | |
| Largemouth black bass | 6,200 |
| Smallmouth black bass | 113,402 |
| Crappie | 60 |
| Catfish | 1,600 |
| Flounder | 142,465,000 |
| Lake Herring | 2,740,000 |
| Whitefish | 3,125,000 |
| Brook trout | 330,742 |
| Rainbow trout | 101,860 |
| Lochleven trout | 188,243 |
| Landlocked Salmon | 42 |
| Lake trout | 570,535 |
| North Carolina: | |
| Largemouth black bass | 87,858 |
| Smallmouth black bass | 1,000 |
| Rock bass | 13,400 |
| Crappie | 900 |
| Sunfish | 44,740 |
| Yellow perch | 385 |
| Warmouth bass | 1,855 |
| Shad | 2,000,000 |
| Brook trout | 111,950 |
| Rainbow trout | 547,635 |
| North Dakota: | |
| Largemouth black bass | 5,082 |
| Crappie | 64,776 |
| Sunfish | 36,270 |
| Catfish | 1,200 |
| Rainbow trout | 9,000 |
| Lochleven trout | 15,000 |
| Ohio: | |
| Largemouth black bass | 28,929 |
| Smallmouth black bass | 3,945 |
| Rock bass | 5,500 |
| Crappie | 2,890 |
| Sunfish | 18,850 |
| Catfish | 7,325 |
| Pike perch | 493,280,000 |
| Rainbow trout | 30,000 |
| Oklahoma: | |
| Largemouth black bass | 137,135 |
| Crappie | 76,080 |
| Sunfish | 174,010 |
| Catfish | 15,805 |
| Warmouth bass | 26,400 |
| Rainbow trout | 900 |
| Oregon: | |
| Blackspotted trout | 192,800 |
| Brook trout | 132,700 |
| Rainbow trout | 274,000 |
| Chinook salmon | 24,089,980 |
| Silver salmon | 708,080 |
| Steelhead trout | 346,789 |
| Pennsylvania: | |
| Largemouth black bass | 22,225 |
| Smallmouth black bass | 650 |
| Rock bass | 1,450 |
| Crappie | 5,765 |
| Sunfish | 37,050 |
| Catfish | 12,475 |
| Yellow perch | 1,650 |
| Brook trout | 472,230 |
| Rainbow trout | 309,390 |
| Lochleven trout | 100,710 |
| Rhode Island: Smallmouth black bass | 45,000 |
| South Carolina: | |
| Largemouth black bass | 313,242 |
| Warmouth bass | 17,482 |
| Crappie | 1,812 |
| Sunfish | 192,871 |
| Catfish | 1,794 |
| Brook trout | 19,000 |
| Rainbow trout | 196,990 |
| Lochleven trout | 18,500 |

*Summary, by States, of the distribution of fish, fiscal year 1936*—Continued

| State and species | Number |
|---|---|
| South Dakota: | |
| Largemouth black bass | 22,716 |
| Crappie | 22,526 |
| Sunfish | 6,660 |
| Catfish | 16,200 |
| Yellow perch | 150 |
| Blackspotted trout | 30,816 |
| Brook trout | 767,800 |
| Rainbow trout | 530,244 |
| Lochleven trout | 169,200 |
| Grayling | 90,000 |
| Tennessee: | |
| Largemouth black bass | 74,765 |
| Smallmouth black bass | 20,000 |
| Rock bass | 19,600 |
| Crappie | 50 |
| Sunfish | 234,355 |
| Brook trout | 139,300 |
| Rainbow trout | 325,368 |
| Lochleven trout | 60,000 |
| Texas: | |
| Largemouth black bass | 276,030 |
| Crappie | 59,825 |
| Sunfish | 157,830 |
| Catfish | 5,650 |
| Utah: | |
| Largemouth black bass | 2,514 |
| Blackspotted trout | 446,000 |
| Brook trout | 637,057 |
| Rainbow trout | 768,358 |
| Lochleven trout | 294,000 |
| Silver salmon | 124,100 |
| Golden trout | 11,100 |
| Grayling | 22,700 |
| Vermont: | |
| Largemouth black bass | 45,250 |
| Catfish | 375 |
| Blackspotted trout | 7,063 |
| Brook trout | 361,791 |
| Rainbow trout | 176,768 |
| Lochleven trout | 500 |
| Grayling | 2,185 |
| Landlocked salmon | 126,640 |
| Virginia: | |
| Largemouth black bass | 107,567 |
| Smallmouth black bass | 10,196 |
| Rock bass | 15,420 |
| Warmouth bass | 75 |
| Crappie | 2,534 |
| Catfish | 10 |
| Sunfish | 78,759 |
| Brook trout | 139,175 |
| Yellow perch | 2,302 |
| Rainbow trout | 516,294 |
| Virginia—Continued. | |
| Shad | 125,000 |
| Silver salmon | 24,000 |
| Washington: | |
| Largemouth black bass | 23,620 |
| Crappie | 23,080 |
| Sunfish | 1,848 |
| Catfish | 3,900 |
| Blackspotted trout | 1,438,400 |
| Brook trout | 734,545 |
| Rainbow trout | 959,245 |
| Lochleven trout | 78,000 |
| Steelhead salmon | 459,600 |
| Grayling | 250,000 |
| Chinook salmon | 21,425,310 |
| Chum salmon | 14,168,067 |
| Silver salmon | 3,663,970 |
| Sockeye salmon | 15,378,500 |
| West Virginia: | |
| Largemouth black bass | 8,528 |
| Smallmouth black bass | 62,267 |
| Rock bass | 3,100 |
| Crappie | 4,320 |
| Sunfish | 91,200 |
| Catfish | 200 |
| Blackspotted trout | 700 |
| Brook trout | 433,300 |
| Rainbow trout | 875,564 |
| Lochleven trout | 423,421 |
| Wisconsin: | |
| Largemouth black bass | 285,600 |
| Smallmouth black bass | 9,685 |
| Rock bass | 1,225 |
| Crappie | 3,688,190 |
| Sunfish | 2,116,263 |
| Catfish | 565,780 |
| Yellow perch | 24,191 |
| Buffalofish | 120,800 |
| Carp | 545,000 |
| Pike and pickerel | 326,000 |
| White bass | 4,300 |
| Miscellaneous fishes | 617,200 |
| Brook trout | 596,800 |
| Rainbow trout | 305,300 |
| Lochleven trout | 430,600 |
| Wyoming: | |
| Largemouth black bass | 95,335 |
| Crappie | 824,000 |
| Sunfish | 24,498 |
| Catfish | 119,600 |
| Blackspotted trout | 7,477,284 |
| Brook trout | 1,118,256 |
| Rainbow trout | 841,385 |
| Lochleven trout | 615,510 |
| Grayling | 4,810,500 |

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# PROGRESS IN BIOLOGICAL INQUIRIES, 1935[1]

By Elmer Higgins, Chief, Division of Scientific Inquiry

[With the collaboration of investigators]

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[1] Administrative Report No. 26, appendix IV to the Report of the U. S. Commissioner of Fisheries for 1936. Approved for publication May 17, 1937.

## INTRODUCTION

Conserving our natural resources is no new concept of the twentieth century; it was a matter of concern in this country a hundred or more years ago. Today practically all people are agreed that it is a matter of common and vital necessity to the welfare of the country.

But while there is no longer a need for defending conservation, or even for justifying the existence of agencies for its wise application, there is constant need for re-defining it; for "conservation" is one of those flexible words that has been bent into many different meanings to suit many different purposes. The phrase, "conservation of fisheries", for example, has whatever connotation a person wishes to give to it.

To many people, perhaps even to most, it implies some form of prohibition. To some it means prohibiting all people from fishing, so that all fish may live their lives in the ocean and in the streams forever unmolested; to others, it means prohibiting only other people from fishing, so that they themselves can enjoy exclusive right to pursue their piscatorial pleasures without competition.

In the face of such confusion, then, what does the Bureau of Fisheries mean by conservation? It means precisely what a business organization does when it refers to a conservative financial policy. In other words, it is the practice of getting for the most people the greatest value from resources without impairing the capital—living off the income without cutting into the principal.

It is generally agreed that a business organization can neither formulate a conservative fiscal plan without a considerable background knowledge of business principles, nor can it maintain a continuous conservative policy without a constant study of current business conditions. Hence the need for economists, market specialists, accountants, etc. In the same way it is impossible for the Bureau of Fisheries to formulate a conservative plan for administering the fisheries without a background knowledge of biological principles, and impossible to carry out such a policy without a continuous current study of conditions affecting the fish. Hence the need for a permanent staff of aquatic biologists. The Division of Scientific Inquiry of the Bureau of Fisheries carries on such a continuous program; and this report sets forth briefly the results obtained during 1935. It must be clear from the following pages that the several researches here recounted are not short, completed studies, but long-term ones, for which this report represents but a small segment.

One of the most significant facts which is becoming ever more apparent is that the service which the Division of Scientific Inquiry offers cannot nearly meet the demand, for the service is considerably limited by the funds at hand. An investigation on a single fishery is seldom a one-man project, particularly when the species studied is widely distributed, when data must be gathered simultaneously from widely separated regions. In fact it is usually inadvisable even to attempt a serious one-man investigation on a large and important fishery. Consequently many species must remain unattended until resources are available to undertake proper studies on them. Even the current investigations have all been considerably

circumscribed during the past several years as a result of curtailed funds. Nevertheless, much progress has been made during 1935.

As our knowledge of the vast, continually changing network of factors influencing aquatic life increases from year to year, it becomes ever more possible to conserve the fisheries by management rather than by restriction. Thus, for the fresh water species throughout the country, much progress has been attained in making the inland waterways biologically more habitable and productive. This is being accomplished in two ways: first, by discovering sources of pollution and encouraging their elimination, usually with the friendly cooperation from owners of factories and mills bordering the waterways; second, by developing methods of improving the natural environment in streams so as to make them more productive of fish life.

The populations of fresh-water fishes have continued to be maintained and distributed by stocking from hatcheries. Current research in this field is devoted mostly to improving the breed of stock so as to obtain the highest fecundity and fertility; also to developing the most efficient feedstuffs so as to get the most fish per pound of feed. There is still an enormous amount of research to be done in the field of aquiculture, however, particularly with reference to the relation between environmental influences and population growth and decline.

As for the commercial fisheries, the most important work in this field has been the development of our knowledge concerning the causes of the great fluctuations in abundance which so deeply affect the fishing industry. The complicated interrelations between these fluctuations, the fishing intensity, the population abundance, and the birth and mortality rates continue to be the subject of intensive studies.

Another important phase of activity in the Division of Scientific Inquiry is concerned with the shellfish industry, particularly with respect to oysters. The most productive work in this field during 1935 has been the development of effective methods for curbing the destructive enemies of the oyster, namely, the starfish and drills. As was pointed out in the 1934 report, however, there still remains a vast amount of work to be done in the field of oyster culture and oyster farming.

## COOPERATION

An effective program of conservation through management is impossible without the wholehearted cooperation of all the people directly or indirectly affected by such a program. It is gratifying, therefore, that States, other Federal departments, and private industry are working with the Bureau of Fisheries more than ever in carrying on scientific fishery investigations. But it must be pointed out that even this much cooperation is not enough. It is true that the provision of biologists, of laboratory facilities, of boats, of test streams, of moral support goes a long way toward achieving the scientific knowledge that is needed for intelligent fishery management; but this knowledge will be of little use until neighboring States cooperate with each other in formulating, passing, and enforcing effective and consistent conservation legislation. That is work of the States that remains to be done in order to make these scientific investigations useful.

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## NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

O. E. Sette, *in charge*

With an upturn of fish prices accompanying the return of meat prices to nearly normal in 1935, activity in the fishing business has reawakened. Trawlers that had been tied up in previous years saw increasing activity, and new ones are being built. The mackerel fleet, which had been experimenting with curtailment of production, resumed unrestricted fishing and landed the largest catch of the present century. The fleet of smaller boats has seen additions to its numbers, and increases in efficiency through new and larger motor installations. A further evidence of increased activity was the development during 1935 of large-scale commercial use of the rosefish. This species hitherto was practically unused but now is being marketed on a large scale, landings totaling 17,000,000 pounds in 1935 as compared with 2,000,000 pounds during the previous year. Similar development is taking place with respect to sea robins caught in the winter trawl fishery off the Virginia Capes.

As to the condition of the resources, the haddock fishery continues to be most productive on the grounds lying off Nova Scotia where the fishery has been concentrated during recent years. On the nearer grounds such as Georges Bank and South Channel, the yield continues low, and, though somewhat improved over the previous year, the level of abundance is still far below that of 1920. Indications are strong that general adoption of the "savings gear"[2] developed by the haddock investigators would bring about a more decided improvement in future yield. Mackerel is at a high level of abundance mainly as a result of the unusually productive spawning seasons of 1930, 1931, and 1933. Among the shore fishes of the Middle Atlantic coast scup and butterfish are maintaining their productivity under the present amount of fishing but squeteague, especially the younger and smaller sizes, undoubtedly are being subjected to more intense fishing than is consistent with obtaining the maximum yield.

[2] Modifications in gear to curtail the destruction of undersized fish in otter trawling, by William C. Herrington. Investigational Report No. 24, U. S. Bur. of Fish.

It is to be regretted that a more complete survey of the condition of the fishery resources is not possible. Limitations of funds and personnel are such that only a few of the important species can be studied. The cod fishery is being more thoroughly fished as the haddock supply has diminished, and during the last several years the portion of the population south of Cape Cod has become notably sparce. Whether this is owing to natural causes or to undue exploitation is unknown. The yield of flounders is diminishing year by year in spite of greater utilization of those that formerly were considered "trash." It is unknown whether this decline in productivity might not have been avoided or might not still be halted; nor is it known whether restrictive legislation on flounder fishing now in force in some States is beneficial. What should be done to halt the declining lobster catch is a further question. In fact, each major fishery is in need of study.

Even the species that are being studied cannot be given the attention that they deserve. There are pressing needs for more adequate treatment in each field. In the Middle Atlantic section there should be experiments to devise methods of fishing that would save young fish from destruction. The mackerel investigation needs facilities for work at sea to further unravel the mystery of spawning failures so as to foresee the crop of yearling mackerel (tinkers). The haddock work also needs sea-going equipment and, further, should have clerical assistance to keep the statistical analyses up to date, for it is by these means only that the conditions of the resource may be known.

It is obvious from the nature of the problems facing the fishery investigator, that accurate and detailed statistical information is essential. For the most part, it is necessary to collect special series for each biological study, but the regularly collected, total-yield statistics are also needed. To render them more suitable for biological purposes, a revision of the method of reporting landings at the principal New England ports, with special reference to area of origin, was worked out in conjunction with the Division of Fishery Industries and will be put into effect in the ensuing year. The areas were delineated in collaboration with members of the North American Council on Fishery Investigations, and it is anticipated that eventually the statistics of all countries participating in the American North Atlantic fisheries may be reported according to a uniform scheme of statistical areas.

Before passing on to the details of results, it is appropriate to acknowledge gratefully the courtesy of Harvard University in providing the staff with quarters in its Biological Laboratories; the cooperation of the Woods Hole Oceanographic Institution, especially in assigning its research vessel *Atlantis* to certain haddock trawling cruises; and the personal interest of Prof. Henry B. Bigelow in advising the staff on many phases of the work. It is a pleasure also to acknowledge the kindness of fishermen and fish dealers in permitting the use of their records and in other ways cooperating in the work.

Two subjects, cod and flounder, considered in separate sections in previous annual reports, are not so treated herein. In both instances the material consists of returns from taggings done in years prior to 1933. Although a few returns continue to be reported, they do

not affect the conclusions previously derived from these experiments. William C. Schroeder, formerly of the staff of the United States Bureau of Fisheries but now connected with the Woods Hole Oceanographic Institution, carried on the cod investigations formerly and still maintains his interest in the subject. To supplement the evidence received from tagging, he is making a study of the structure of scales collected from tagged individuals. Results from this research may be expected at a future date.

### HADDOCK

The total quantity of haddock landed at principal New England ports in 1935 reached nearly 157,000,000 pounds. (This includes all United States' landings except relatively small amounts landed at minor ports.) This was 23 percent greater than the catch of the previous year; in fact, the largest since 1930, and the fourth largest in the history of the fishery. As in 1934, the greater part came from the fishing banks lying off the Nova Scotian coast (Sable Island, Banquereau, Browns, and La Have); landings from this area increasing from about 82,000,000 pounds in 1934 to 91,000,000 pounds in 1935. Georges Bank continued in a minor role, although the catch increased from about 39,000,000 pounds in 1934 to 63,000,000 pounds in 1935. This was 40 percent of the total haddock catch, whereas in earlier years Georges averaged nearly 80 percent of the total.

One of the first objectives of the program of investigation laid down in 1930 was to obtain a sound understanding of changes in the haddock catch such as occurred during 1935. From this, the program was directed toward the determination of the productivity of the fishery at various levels of fishing intensity in order to make possible the development of a plan of rational exploitation that would produce a maximum permanent yield at a reasonable cost of production. This program was in line with the general theories of fisheries investigations developed by Dr. William F. Thompson, director of investigations, International Fisheries Commission, who has affected materially the trend of the haddock work through earlier association with some of the investigation's personnel.

Although realization of the above objective requires a longer period of observation and more thorough analysis than has been possible with present personnel and facilities, there has been considerable progress along the lines of study described in previous annual reports. This includes particularly the collection and analysis of commercial catch records to obtain a measure of changes in abundance; and the study of extensive haddock length-frequency and scale samples to determine growth rate, mass movements, and the age and size composition of the population. The work has continued under the direction of W. C. Herrington assisted by J. R. Webster. Limitation of funds and personnel restricted field work mainly to the Boston Fish Pier where vessel interviews regularly provided information as to fishing time, position, and other relevant data for all haddock trips. Field observations included 2,620 interviews, 66,000 length measurements, and 4,200 scale samples. F. E. Firth handled most of the fish-pier work during the winter. Temporary personnel was employed during the summer while Mr. Firth was assisting in the

mackerel investigation. In addition to the field work at the fish pier, two trawling trips were made on the *Atlantis* to obtain material for the study of the abundance, distribution, and growth of 1-, 2-, and 3-year-old haddock which, being below marketable size, cannot be obtained from the commercial catch.

*Georges Bank and adjacent areas.*—As stated in the 1934 annual report, the success of the fishery on Georges Bank during any year, that is, the return for a given unit of fishing effort, is primarily dependent on two factors: (1) The rate at which the commercial stock declines as the result of catch and natural mortality. (2) The contribution to the commercial stock from the young haddock spawned 3 years earlier. There can be no sustained improvement in the catch except through the growth to commercial size of a large group of young haddock. Mass migrations do not appear to be an important factor; at least, they have not been since our detailed observations began.

A feature of the last 4 years has been the appearance of 3 fair year classes in the commercial catch on Georges Bank. These classes were spawned in 1929, 1931, and 1932. Of these, the 1929 class was the best and served to increase the fishermen's catch considerably in 1932. The 1931 and 1932 classes were less successful, and under a fishing intensity such as prevailed on Georges in 1927–33, hardly would have maintained the level of the fishery in 1934 and 1935. However, during these years a large portion of the fishing fleet was diverted to the Nova Scotian banks as a result of poor fishing on Georges and improved catches elsewhere. Hence, the fishing intensity on Georges decreased to less than half that of 1933 and earlier. With this lessened strain, the Georges haddock stock has increased for 2 successive years, the first 8 months of 1935 providing an average daily trawler catch about 30 percent better than the same period in 1933.

The moderate improvement in the fishery on Georges during the past 2 years has been encouraging, although the present population is far below the level prevailing in the years prior to 1930; and partial recovery occurred only with a greatly reduced fishing intensity.

The trend of the Georges Bank haddock fishery in 1936 depends on two elements now but qualitatively known. First, the abundance of the 1933 class which reaches commercial size in the winter of 1935–36. Second, the distribution of the trawling fleet, i e., the amount of fishing effort that will be expended on this bank in 1936. The first element—abundance of the 1933 class—cannot be evaluated until later in the year when it has been possible to analyze data from the winter fishery. However, cursory examination of incomplete records indicates that it may approximately equal the classes of 1931 and 1932. The second element—distribution of fishing effort—could be estimated if the relative abundance of fish on Georges and Nova Scotian banks were known. This too can be but roughly estimated until the results of the winter fishery can be analyzed. In view of a probable decrease in the catch per day on the Nova Scotian banks and an increase on Georges, one may expect a larger percentage of fishing effort to be concentrated on Georges Bank in 1936. This increased strain will, to some extent, counteract the expected increase

from the 1933 haddock year class. Therefore, the final 1936 results should be a total Georges Bank haddock catch considerably greater, and an average daily trawler catch about the same or a little better than in 1935.

*Nova Scotian Banks.*—The haddock catch on the Nova Scotian banks in 1935 totaled 91,000,000 pounds, an 11-percent increase over 1934, resulting primarily from augmented fishing effort. During the first 8 months of the year the average daily catch per trawler was about the same in 1935 as in 1934, indicating that the fishery apparently has not yet made serious inroads into the stock of marketable haddock. However, the catch has been maintained partly as the result of the extension of the fishery to the eastward on Quereau.

Our knowledge of the haddock population off the Nova Scotian coast is less complete than for that on Georges Bank, but it appears that the success of the fishery depends on the same factors, i. e., mortality rate and the contribution to the commercial stock from the younger year classes. If this be true, the 1936 fishery should be somewhat below the 1935 level unless the 1932 year class (which will begin to reach commercial size in the summer of 1936) is relatively abundant.

There have been some indications that insofar as the spring season (that is, the spawning period) is concerned, a new year class does not exert a maximum effect on the commercial catch during the first year its members reach marketable size. Thus, although the 1929 class reached marketable size in the summer and fall of 1933, the catch per day in the following spring (1934) was not so great as in the spring of 1935. But during the summer of 1934 the catch was considerably greater than during the summer of the following year.

*Requirements of the investigation.*—In the above discussion the trend of the fishery has been considered mainly in qualitative terms. The most pressing requirement now is a more complete analysis of material so that the various elements determining the success of the fishery can be studied quantitatively. Only then can we accurately describe the causes of fluctuations in abundance, or predict the effect of measures designed to improve the catch. Length-frequency and scale data particularly need more thorough study which limitations of time and personnel so far have made impossible. The haddock fishery is pursued on a large scale throughout the year, and extends over a wide area from Nantucket Shoals to the Grand Bank of Newfoundland. Consequently, an extensive series of data is required to follow the fishery, and there is no slack season in which to bring the analysis up to date.

Some special problems could not be given sufficient attention during the past year. An accurate measure of the annual variations in haddock abundance is of fundamental importance to this investigation. In general, these variations are shown by the availability of haddock to the fishermen, which is measured by the average daily catch per trawler. But a change in the efficiency of the fishing boats whose catches are analyzed will distort this measure of abundance. Such a change took place during the years 1929–31 when the fleet changed over from the ordinary otter trawl to V. D. or semi-V. D. gear. An analysis not yet completed indicates that this increased the efficiency of the fleet by at least 25 to 30 percent.

Another distortion appeared in our measure of haddock abundance on Georges Bank when in 1934 the fleet of large trawlers shifted a large part of their fishing activity to the Nova Scotian banks. Georges was fished only when the yield was particularly good; therefore, the catches of these boats give too high an average for 1934 and 1935. The extent of this distortion must be determined before quantitative interpretation of the data is possible.

If available knowledge is to be used to prepare for the fishing industry a reliable forecast of the trend of the fishery for one or more years in advance, one other type of datum is absolutely necessary. This is an annual evaluation of the abundance of young haddock in year classes below marketable size. These data also would enable us to obtain a measure of the natural mortality rate of young haddock. To secure such data requires considerable trawling with special gear. No extensive work of this kind has been possible due to lack of vessel facilities, but during the past year some exploratory work was done on the *Atlantis*, made available by courtesy of the Woods Hole Oceanographic Institution. Only qualitative conclusions are possible from the material so far collected. Quantitative results would require the use of a vessel equipped for regular trawling and a number of comprehensive cruises each year.

*Hydrography.*—During the years 1931–34, hydrographic data were collected and drift bottles released over an area covering Georges Bank and Browns Bank. The cruises were made during the spring of the year to obtain data for the study of ocean currents and their effect on the drift of haddock eggs and larvae spawned in this region. Although no field work of this kind was done in 1935, 25 drift bottles were received from the April 1934 experiment and two from the experiment of June 1933. From the 1934 experiment there now is a total of 91 returns from 629 released. Of these, 16 percent came from west and south of Cape Cod, 42 percent from the Gulf of Maine, 13 percent from the Nova Scotian and Newfoundland coast, and 24 percent from Europe. One-half of the 1934 drift bottles were painted a brilliant yellow and released alternately with clear glass bottles. A red card was enclosed in the unpainted bottle. At the end of 1935 returns from painted bottles were 27 percent higher than from unpainted ones.

Although attainment of the general objectives of the investigation remains for the future, certain lines of study have already yielded results of immediate practical importance. Extensive field work in 1931–32 showed that the trawling fleet annually destroys great numbers of small haddock below marketable size. This number varies according to the abundance of young fish on the banks and the number of boats fishing. In 1931 on Georges Bank it reached an estimated total of more than 60,000,000 baby haddock compared to a catch of not much more than 30,000,000 of marketable size. Since then the destruction has been less, not because the fishery has been less destructive but because baby haddock have been less numerous and the fishing intensity has been reduced by the diversion to the Nova Scotian banks of a considerable part of fishing operation. Nevertheless, the situation continues wherein every brood of young fish is subject to a period of extensive destruction during its early years before it reaches marketable size. This loss of young haddock

serves to increase the drain on the fishery to nearly the same extent as the capture of equal numbers of marketable haddock. In other words, this destruction in some years doubles and trebles the strain on the fish population, and on the average must form a very considerable part of the fishing mortality. There also has been an increasing trend toward the marketing of smaller haddock, many averaging little more than half a pound in weight. Given another year on Georges Bank, these fish would treble in weight while in 2 years they would weigh nearly five times as much and be of more value per pound.

*Recommendations.*—There appear to be four possible measures that would decrease the destruction of undersized haddock. These are closed seasons, closed areas, minimum market size, and minimum mesh size. Of these, the most effective and practical are a minimum mesh size and a minimum market size. In 1931 and 1932 a practical type of "savings gear" for the New England otter-trawl fishery was developed through an extensive series of experiments. A report on this work was published in 1935 recommending a minimum mesh size of 4¾ inches for use in all otter trawls. So far, little action has resulted from this recommendation in spite of the clear evidence in its favor.

A more popular description of the savings-gear work and of the importance of saving undersized fish, is in preparation for use as a fisheries circular. It is hoped that this will find a wider audience because of its less technical nature. Certainly, convincing the trawler operators and fishermen of the importance of protecting small fish is a prelude to any effective action.

Savings gear experiments have demonstrated a practical method by which the strain on a fish population can be decreased without the application of any restriction such as closed seasons or closed areas. Adjustment of mesh size to reduce the destruction of small unmarketable haddock certainly will reduce the strain without curbing the fishery. Furthermore, in cases where over-exploitation is reducing a fish population to uneconomic levels of abundance, adoption by the operators of a suitable mesh size should prove more effective in conserving the fishery than restrictions such as closed seasons or closed areas. Once growth rates and natural mortality rates have been established, it appears possible to determine the average fish size that will produce a maximum catch over a period of years without depleting the population. Then, by proper adjustment of the selective gear (mesh size in the case of the otter-trawl fishery), it should be possible to eliminate from the commercial catch a large proportion of the young, rapidly growing fish below this size. If this permits the survival of an adequate spawning stock, it may well be that such protection would be sufficient to prevent real depletion, irrespective of the intensity of the fishery. In the case of the North Atlantic haddock, we do not yet have such data as will permit the determination of this optimum size, but there is some indication that on the Nova Scotia banks it may be not far from the present accepted minimum commercial size.

## MACKEREL

With the resumption of unrestricted fishing in 1935 the offshore fleet landed 53,000,000 pounds of mackerel, the largest catch of the

present century. Though a record catch, it is not much larger than others of recent years, for the mackerel population has been in a phase of high abundance during the last 10 years. The average annual catch for the decade ending with 1935 was 41,000,000 pounds, which is a marked increase over the previous decade with its average of 17,000,000 pounds, and in even more striking contrast with the decade ending with 1915 when the average was only 11,000,000 pounds. But even the present high level is not to be regarded as the apex of yield for in the decade ending with 1885, the average was 80,000,000 pounds, an amazing yield compared with present experience.

This brings into high relief the dominating feature of the mackeral resource—its extreme fluctuations in yields. To find the causes of these fluctuations and to discover means of turning this knowledge to economic advantage has been the purpose of the research on the mackerel fishery.

The studies which have been under way since 1925 have proven that the changes in yield are mainly caused by changes in abundance of mackerel, and only secondarily by variations in the rate of fishing or by extensive migrations of the fish. Further, it has been learned that the changes in abundance are due to great differences from one year to another in the numbers of young mackerel that survive to commercial size.

The present state of knowledge has been arrived at by the study of changes in the mackerel population by the sampling method. In 1935, as in previous years, this work has been under the direction of Oscar E. Sette, who was assisted in the field work by Frank E. Firth. Basic data collected were the statistics on daily landings of each vessel of the fleet, information from interviews with fishermen covering 1,371 of the 2,560 fares landed, and samples of 51,347 mackerel from 752 different catches. For purposes of determining age composition of the population, length measurements were taken of all samples. In addition, meristic characters such a fin spines and rays were measured on 1,169 individuals to serve as an indication of subdivisions or "races" in the population.

In the laboratory, time available after meeting current demands was spent in organizing for publication the results of 10 years' accumulation of data. This has involved refinement of the method of statistical treatment to measure abundance, development of means of treating length measurements of mackerel to provide suitable accurate age-composition estimates, and their application to the 10-year series. In addition, some progress was made in analysis of tow-net collections of eggs and larvae of the season of 1932. That season is now known to have contributed but few recruits to the stock and therefore must have been one of high "infant mortality." The most commonly accepted theory of the cause of such year-class failures has been that the newly-hatched young do not survive the yolk-sac stage. But the data of 1932 do not indicate an appreciably higher rate of mortality at this supposedly critical point than during subsequent stages. If this is confirmed by examination of other years' data, it will have important bearing on further search for the causes of failures in year classes—a phenomenon occuring not only in the mackerel but in many important food fishes. This problem has been a perplexing one to the students of fisheries biology, and

has not yet been satisfactorily explained in the case of any marine species.

While each year's study has added considerable knowledge to the store needed for rational exploitation of the mackerel fishery, the problem is so complex that the goal is yet far from attainment.

With fluctuations the dominant feature in this resource and with their causes due to natural conditions not subject to control by man, the problem of proper utilization depends on making the most of what nature provides. There are at least two problems involved in providing the information needed to bring about such wise use. Most obviously useful is to find means whereby the fluctuations may be anticipated so that fishing and distribution may be adjusted to the rapidly changing volume of supply. The other is to find out what age (or size) of mackerel may best be fished in order to get the most of each year class, and to find means of encouraging the methods of fishing that, on the average, will take such sizes.

Considerable progress has been made in developing means of foreseeing the changes in the supply of mackerel. Predictions have been prepared and, except in the case of 1935, published at the beginning of each season since 1928. Within their scope, these predictions have been encouragingly close to the mark but their utilization by the industry has not been extensive. This appears to be due to their being restricted to estimates of only the larger sizes of mackerel, and further limited to estimates of the probable results of the season as a whole rather than its separate parts. Our present inability to predict abundance of small mackerel (under one pound) is serious because frequently a large portion of the catch consists of these small mackerel, known as "tinkers" to the trade, and their abundance often makes the difference between a good and bad season. Similarly, the changes in abundance within the season often are more important than the total catch for the year because the principal means of adjustment is to freeze or process surplus fish; and to adjust such operations to the season's run it is necessary to know when the surplus will be greatest. For instance, dealers are loath to freeze fish early in the season even when the market is full and prices low, for fear that later the oversupply may be still greater and prices still lower.

To be able to predict abundance of tinkers and thus round out the forecast service requires that their abundance be measured during the first year of life, which in turn requires special observations at sea that can be made only by means of a research ship. Work on this phase had progressed to a promising stage, but ceased in 1932 when the *Albatross II* was decommissioned for lack of operating funds. Although observation in this field has been discontinued, the analysis of results is still under way (as above mentioned) and will have important bearing on any future work in this field.

The problem of predicting the "run" at various parts of the season is amenable to solution. There are indications that there exist, within the mackerel population, different types whose habit is to appear fairly regularly at certain times and places, depending on their age. These peculiarities were taken into account in the prediction for the 1935 season and pointed toward an unusually large run in the offing of southern New England in the spring season

tapering off by the middle or end of August. This proved to be the case, experience differing from prediction only to the extent of the disappearance of these fish about 1 week later than the predicted date. As for the remainder of the season, no prediction was ventured, for tinker mackerel were likely to dominate that portion of the season and there was no means of foreseeing the abundance of this category.

More important than predictions, in the long run, is the determination of the best stage in the life history for commercial exploitation. Generally speaking it pays to let fish "grow up" before catching them, for the small and young grow very fast, and the gain from added weight far exceeds the loss from mortality. But in the case of the mackerel it is not a matter of simply balancing growth increase against mortality loss. The population appears to contain two types (perhaps races) of mackerel. One type, which for convenience has been designated "persistent", has an apparent mortality (decline in catch per unit of fishing effort) in the neighborhood of 20 percent; the other, termed "transitory", has one of 70 or 80 percent.[3]

Other peculiarities of the two types such as time and place of occurrence, growth rates, etc., lead one to believe that the differences in apparent mortality are not merely chance variations but are linked with the habits of the fish. If the high apparent mortality of the transitory type is the result of fishing out too large a percentage per annum because they school inshore and are readily accessible to the fishermen, then it would pay to lessen the fishery strain; but if, on the other hand, the mortality is apparent rather than real, and disappearance is due to changes in habits of the mackerel as they grow older, such as a tendency to swim deeper, or a tendency to scatter rather than to school, or even to migrate to distant waters, then it would pay to take them while they are easy to catch even though they be small. Such little evidence as is available favors the latter view; but to make certain it is necessary to perform large-scale tagging operations and perhaps extend other field observations into waters off the coast of Canada—projects that are beyond present facilities. None the less, some work on this phase was accomplished during 1935 by a less expensive (and also less promising) method involving studies of meristic characters to distinguish different races or types within the population. Since the subdivisions of the population may be expected to occur mixed at one time and separate at another, and to change in locality with increase in age, the subject is more complex than the usual racial study and hence less likely to yield to this method of investigation.

### SHORE FISHES OF THE MIDDLE ATLANTIC STATES

The ultimate object of these investigations, under the direction of R. A. Nesbit, is to provide a rational basis for more efficient utilization of the fishery resources of the waters between Cape Cod and Cape Hatteras. Two requirements must be met if this objective is to be attained: (1) The life histories and conservation needs of all

[3] See Outlook for the Mackerel Fishery in 1933 by O. E. Sette; Bureau of Fisheries, Fishery Circular No. 14, pp. 11–12. May 1933.

important species must be known; and (2) some provision must eventually be made for unified administration.

Thus far, limited appropriations have permitted inclusion of only a few of the several important species in the investigational program, and it has not been possible to maintain continuous and simultaneous observation of even these few over the whole region. This is unfortunate for it has become increasingly apparent that all important species and all localities must be considered together in drafting conservation recommendations. The more productive forms of fishing gear, pound nets, otter trawls, and purse seines, take more than one species, so that protection of one species may interfere with legitimate exploitation of other species. In order to complete the program and to render effective the results of past efforts, it will be necessary to provide for extension of activities to include investigaton of sea bass, croakers, summer flounders, winter flounders, bluefish, shad, and striped bass.

The need for unified or coordinated administration arises from the migratory habits of the fish, and from the interstate traffic in the products of the fishery.

*Squeteague.*—The more important features of squeteague life history and certain conservation considerations based on them have been presented in earlier reports of this series. For convenience these are summarized as follows:

(1) Squeteague spawn in inshore waters from Massachusetts to North Carolina in late spring and early summer, but there is considerable doubt as to whether there is significant survival from spawning north of the coast of Virginia.

(2) Nearly all squeteague spend their yearling summer south of Delaware Bay, so that that portion of the range constitutes a nursery area in which yearling squeteague predominate in the catches, while the area north of Delaware Bay is frequented by 2-year-old fish or older—the survivors of the southern fishery for yearlings.

(3) Squeteague grow much more rapidly north of Delaware Bay than in southern waters.

(4) The decline in numbers of large squeteague in the Middle Atlantic States, especially in northern New Jersey and New York, has not been caused by excessive fishing locally but by increased fishing for yearlings in the southern nursery areas.

(5) The southern fishing for yearlings involves the capture and destruction of some squeteague too small to be marketed. In the report for 1934 it was recommended that experiments be undertaken to determine whether the waste of undersized squeteague could be mitigated or eliminated by changes in the design of pound nets.

In 1935, R. A. Nesbit actively engaged in, or directed (1) a preliminary survey by W. C. Neville of pound net fishing methods in Virginia and North Carolina to observe further the extent of waste of small fish and to secure a basis for planning the experiments referred to above when resources become available; (2) further examination of scale and length-frequency data, including samples taken by Mr. Neville in the southern survey. The results of these activities are discussed separately below.

In Pamlico Sound, N. C., Mr. Neville found conditions in early July very similar to those reported by Higgins and Pearson[4] for 1925. Eight random samples totaling 1,164 squeteague were taken at the nets. Of these, 308, or 26.5 percent, were below legal size. Since squeteague of barely legal size are not desirable, some squeteague slightly longer than 9 inches were discarded so that approximately 30 percent of the catch was not utilized at the time and in the locality covered by observations. In Chesapeake Bay 16 random samples totaling 1,610 squeteague were taken in later June. Of these, 118, or 7.3 percent, were below the legal minimum. From traps set in the ocean near Hog Island and off Virginia Beach, Va., 14 random samples totaling 1,806 squeteague were secured. Of these, only 45, or 2.5 percent, were undersized.

In 1929, when extensive series of samples were secured from the traps in Chesapeake Bay and from those near Hog Island, the waste of undersized fish was negligible. In that year it was also noted that yearling squeteague did not appear in the Virginia catches until August, when most of them were above the legal minimum. It is probable, therefore, that waste of undersized squeteague seldom, if ever, reaches very large proportions in Virginia.

In the Pamlico Sound region of North Carolina, however, waste of small fish, especially in the early summer months, appears to be of considerable magnitude. Of especial interest, therefore, is the observation (based on examination of the circulus spacing on the scales) that more than half of the 1935 yearlings consisted of squeteague which had spent the latter part of the preceding summer north of Delaware Bay. If these fish had survived, most of them would have returned to the North in 1936. It is apparent, therefore, that the conditions described by Higgins and Pearson in 1925 and the recommendations made by them are of more than local significance.

Further examination of northern scale collections indicates that there are two groups of squeteague in the Middle Atlantic region. The first of these appears as 2-year-old fish in southern New Jersey after having spent their yearling summer in the South. Although some of these fish continue to return to southern New Jersey in succeeding years, most of the survivors of the southern New Jersey fishery spend their summers in northern New Jersey and western Long Island, N. Y., when 3 years old or older. Since the fishery in southern New Jersey has increased during the last 15 years, the increased mortality among 2-year-old squeteague of this group has undoubtedly contributed to the diminution in numbers of large squeteague in northern New Jersey and western Long Island. Restriction of the fishing in southern New Jersey would probably be of little benefit, however, for the 2-year-old fish produced there compete in the markets with the Virginia and North Carolina yearlings. Elimination of these fish from the market would stimulate the southern fishery toward a still heavier toll of yearlings, perhaps resulting in a still further decrease in abundance in northern New Jersey.

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[4] Higgins, Elmer, and J. C. Pearson. Examination of the summer fisheries of Pamlico and Core Sounds, N. C., with special reference to the destruction of undersized fish and the protection of the gray trout, *Cynoscion regalis* (Bloch & Schneider). Bureau of Fisheries, Document 1019, 1927.

The second group appears as 2-year-old fish in eastern Long Island, N. Y., after having spent their yearling summer in the South. Many of these fish continue to return to this locality in succeeding years, but it is possible that the large squeteague occurring in southern New England belong to this group. This eastern Long Island group differs from the New Jersey-western Long Island group in that it provides larger catches in the spring and early summer than in autumn, while in New Jersey the reverse is the case. This suggests an explanation of the invasion of New York and southern New England[5] by remarkable numbers of large squeteague 30 years ago. All accounts agree that these large fish were not preceded by exceptional numbers of small fish, and in eastern Long Island, at least, it is known that they were present only in late summer and autumn, the spring catches having been actually smaller than those of the years preceding and following the run of large fish. Hence, it appears that this phenomenon was the result of a temporary extension of the range of the New Jersey-western Long Island group.

From the foregoing it is apparent that the problem of squeteague conservation presents quite different aspects according to the point of view from which it is examined. From the point of view of the commercial fishermen and anglers of New York and New Jersey, all fishing for squeteague south of Delaware Bay is disadvantageous. From the point of view of southern fishermen, it is probable that little or nothing is to be gained by protection of yearlings after they have reached marketable size. For growth is so slow in southern waters that it is very doubtful whether the growth of those yearlings which remain in the South compensates for the losses from natural mortality and from emigration to northern feeding grounds. If the problem be considered from a national rather than from a sectional point of view, it must be admitted that insufficient data are available to permit a decision as to whether sufficient benefit would result from curtailment of the southern catch of yearlings to compensate for the resulting losses.

The more important items of gain and loss can be listed but their magnitude cannot be estimated closely at present. The principal gain would be an increase in abundance of squeteague in New Jersey and New York. Since these would be medium and large squeteague which bring better prices than small sizes, the gain in value would be even greater than the gain in pounds. Increased abundance of the larger sizes which frequent the waters of northern New Jersey and New York would improve angling conditions and the important business of catering to anglers would be stimulated. Against these gains must be set not only the loss to the southern fishery of the squeteague protected there, but the losses due to curtailment of the catch of other species as well, for most squeteague are taken in pound nets which also take considerable quantities of other species not all of which appear to need protection.

Even if it could be shown beyond doubt that the greatest good to the greatest number could be accomplished by curtailment of south-

[5] Bigelow, H. B. and W. W. Welsh. Fishes of the Gulf of Maine. Bulletin, U. S. Bureau of Fisheries, vol. 40, pt. 1, 1924 (1925).

ern fishing, there exists no practical means of accomplishing such a curtailment, for control of the fisheries in territorial waters is vested in the several States. Experience has shown that local interests are considered first when conservation measures are proposed. It is not to be expected, therefore, that the individual States will adopt conservation measures other than those likely to benefit the local fisheries.

However, all sections can endorse the proposal to seek a practical means of preventing the destruction of squeteague too small to be marketed; but until funds are made available, the necessary observations and experiments cannot be undertaken.

*Scup.*—Investigation of this species was continued by W. C. Neville. Catch records of the summer fishery in 1934 were compiled and analyzed, observation of the winter trawl fishery was continued, and progress was made on a comprehensive report dealing with the life history and the conservation requirements of scup.

Attention has been focused on observation of the effects of the increased exploitation to which scup has been subjected in recent years. Most of this increase is due to the winter fishery, the scup catch of which has more than doubled since 1931 (rising from approximately 1,686,000 pounds in that year to 3,844,000 pounds in 1935). To a large extent the increases are due to the greater numbers of vessels engaged in the fishery. It is difficult to measure changes in abundance closely, for the catch of each of four species, scup, sea bass, fluke, and croakers, is influenced greatly by variations in availability due to changes in hydrographic conditions, and by varying market preferences. Everything considered, however, it appears that abundance has remained high or even increased somewhat in spite of the increased fishery.

Nor has there been, thus far, indication of diminution in the average annual increments to the stock. Continued high yields from the New Jersey summer pound-net fishery, in which the younger-age groups predominate, indicate that most recent spawnings have been very productive. In the winter fishery also, the younger age groups have been well represented. Of the year classes since that of 1926, only the 1929 and the 1933 year classes have been below average.

There is no need to reduce the catch of scup in order to increase the numbers of spawning adults. The annual increments of young are extremely variable, and to a very great extent are independent of the numbers of spawners. For example, the abundant 1927 and 1928 year classes were produced in years in which the numbers of spawners were relatively small, but in 1933, when spawners were very abundant, spawning was comparatively unproductive. The results of tagging experiments also suggest that the present catch of adult scup does not cause excessive reduction of scup of spawning age. In no case has the percentage of tags returned exceeded 3 percent. Since returns from squeteague, flounder, cod, and striped bass experiments range from 10 to 30 percent, it appears that the scup fishery imposes a much smaller strain on the spawning stock.

Although the present catch of marketable sizes of scup is not excessive, present methods of fishing cause considerable waste of scup too small to be marketed. This necessarily reduces the abundance

of marketable scup in subsequent years, thereby increasing the costs of catching them. Because of lack of funds, it has not been possible to devise practical savings gear to permit the escape of the unmarketable sizes.

## FISHERY INVESTIGATIONS OF THE SOUTH ATLANTIC AND GULF COASTS

### SHRIMP

MILTON J. LINDNER, *in charge*

As in preceding years, excellent cooperation in the investigation of the natural history and abundance of the shrimp has been furnished by the Louisiana Department of Conservation, the Texas Game, Fish and Oyster Commission, and the Georgia Tidewater Department. Offices and laboratory facilities have been supplied by the Louisiana Department of Conservation, the Georgia Tidewater Department, and the San Patricio Canning Co. Headquarters have been maintained in New Orleans and field stations were located at Beaufort, N. C.; Brunswick, Ga.; and Aransas Pass, Tex. During the spring of 1935 John C. Pearson was transferred from New Orleans, La., to St. Augustine, Fla., to continue his studies on the eggs and larvae of the shrimp.

The common shrimp, *Penaeus setiferus*, because of its outstanding dominance of the fishery, has received most of the attention of the investigators. At least 95 percent of the shrimp catch is composed of individuals of this species.

Shrimp still ranks preeminent among the sea foods of the South, and the shrimp fishery with an annual catch of approximately 100,000,000 pounds is one of the major fisheries of this country. Results of studies in 1935 have shown that this fishery undergoes sharp fluctuations. Shrimp were exceedingly scarce in the spring and early summer of 1935. In spite of this scarcity, which was general throughout the entire South Atlantic and Gulf, the late summer and fall fishery proved to be relatively successful in most localities. The Georgia and Florida fall fisheries in particular were much improved as compared with the previous several years. On the other hand, in some localities, particularly Corpus Christi Bay, Tex., the fall catch has been much less than expected. These fluctuations indicate that definite changes in the magnitude of the shrimp population do occur, and that for a complete understanding of the fishery a study of these changes must be made, their nature and causes determined, and the effect the fishery has upon them ascertained.

Such studies are complicated by the fact that the shrimp fishery is not established at a constant level, but is marked by a continual expansion and increase in fishing effort, which has been particularly evident along the South Atlantic coast. More and larger boats drawing larger nets, introduction of Diesel power, and the conversion of gasoline engines to the use of cheaper fuel have all contributed toward this increase. Consequently it is of vital importance that the proper type of statistical system be introduced as soon as possible in order that the trend of the abundance of the fishery be followed, the fluctuations of supply determined, and an understanding of their causes secured. Due to the constantly increasing effort it is impossible, with

the present inadequate records, to secure an estimation of the fluctuations. Since the shrimp fishery extends over practically the entire coastal area of eight Southern States, it is impossible for the present staff to gather these statistics in the detail in which they should be secured.

*Sexual maturity.*—At Beaufort, N. C., Dr. J. S. Gutsell completed his studies of the structure and development of ovaries and ovarian eggs of the commercial species of shrimp and is finishing a report on his findings. This investigation has shown that in the Beaufort region the common shrimps in many instances probably spawn at least twice during the spawning season. Spawning at Beaufort is most active in May, but continues throughout the summer and a large part of the autumn. It seems probable that some of the shrimp in this vicinity may survive through two winters and spawn during the second year. In any event, the numbers which spawn in their second year appear to be exceedingly few. Definite criteria have been found for mature and spent ovaries.

*Food.*—Since the completion of the ovarian studies Dr. Gutsell has been engaged in determining the food of the shrimp and has examined the contents of hundreds of stomachs of the common shrimp, *P. setiferus*, and the grooved shrimp, *P. brasiliensis*, including a considerable number from young of 1 to 3 inches in length. In addition, shrimp have been kept in aquaria and fed various foods. Fish, shrimp, and oysters were readily eaten, but an apparent preference seemed to be shown for small barnacles. The stomach contents indicate that the principal natural diet appears to be small crustacea (such as Cumacea) and polychaete worms. Both these forms are generally found burrowing in mud or sand, where they are apparently readily found by the shrimp. Mollusks, barnacles, fish, plants, and plant material, including diatoms, small filamentous algae, pieces of tissue from higher plants, and sand are also found in the stomachs of the shrimp.

Since the variation in food supply may vitally affect the abundance and distribution of shrimp, it is a subject which cannot be neglected in the present study, and which may give an important clew to the causes of fluctuation in the shrimp fishery.

*Weight-length.*—In Texas, Kenneth H. Mosher has continued the sampling of the commercial catches during 1935. A total of 9,773 shrimp were measured and examined for stage of sexual maturity. Of this number, 5,435 were from Aransas Pass, 4,038 were from Galveston, and 300 were from Port O'Connor. The relative importance of *P. setiferus* is indicated by the fact that of all the shrimp examined throughout the entire year over 98 percent were of this species. In addition to the length measurements, Mr. Mosher weighed 4,200 shrimp in order to obtain an extensive list of data from which to compute the weight-length relationship. These data show that seasonal differences occur in the weight-length relationship, and may, therefore, throw light on various questions concerning shrimp biology; for example, on whether or not overcrowding of the population exists. This study will therefore be continued.

*Larvae.*—Our understanding of the life histories of the two commercial shrimp, *P. setiferus* and *P. brasiliensis* and other peneids has become more clarified during the past year by the recognition of the early growth stages of both species by John C. Pearson who has been

stationed at St. Augustine, Fla. From living and preserved material these species of shrimp have been traced through the egg, nauplius, zoea, and mysis stages of development. It was essential that the eggs and young be distinguished before any clear-cut conception of their early life histories could be possible. It is interesting that the peneids undergo more molts and stages of growth than any other group of decapod crustaceans. Nevertheless probably no complete series of larval forms has yet been traced out for any single species of the *Penaeidae*. The present studies on eggs and young of these commercially important shrimps not only establish the distinctive morphological features during larval life, but also contribute significantly to our knowledge of the spawning season and the distribution of the young.

Observations at St. Augustine and Fort Pierce, Fla., have proved definitely that many eggs and planktonic young of these two species of commercial shrimp come into the shallow estuarian rivers and lagoons from the ocean through the various inlets. The spawning season along the Georgia and Florida coasts, as previously indicated by examination of ripe adults, extends at least from March into September for the common shrimp, and probably throughout the year for the grooved shrimp, which appears to be a more characteristically offshore and deeper water species.

During the coming year intensive study will be made on the living eggs and young of these southern shrimps to ascertain among other things the rate of development at various stages, the rapidity of the natural movement of young, and the possible factors influencing mortality.

*Migrations.*—Regular sampling of the shrimp population along the South Atlantic coast aboard Fisheries Launch *58* was continued by W. W. Anderson for the first 6 months of 1935. The territory covered extended from Cape Romain, S. C., to Cape Canaveral, Fla. As in previous years, nine outside and two inside stations were visited regularly once each month. The particular area covered represents by far the greater portion of the shrimp-fishing localities on the South Atlantic coast. The stations were so established as to be from 35 to 50 miles apart and to cover the more important fishing centers along the coast, in this way giving us a fairly representative sample of the entire fishery. At each station at least two hauls of ½-hour duration each were made with a 50-foot otter trawl. Plankton tows were made and water temperatures and salinities recorded for every station. Shrimps from each haul were measured and the stages of gonad development observed. All fishes taken in the hauls were recorded as to species and numbers. During the last 6 months of the year such sampling was discontinued in stations north of Brunswick, Ga., but maintained from Brunswick, Ga., to Cape Canaveral, Fla.

As mentioned in the previous annual report, the data gathered aboard Launch *58* indicated quite definitely that a migration of shrimp occurs along the South Atlantic coast. During the fall and winter of each year it was observed that large shrimp disappear from the Georgia coast. At the same time an important fishery for such large shrimp developed off the central Florida coast from St. Augustine to Cape Canaveral. These two facts suggested four pos-

sible explanations; namely: (1) A southern migration into Florida of the larger Georgia shrimp during the fall and winter. (2) Depletion through fishing of the large Georgia shrimp, while the Florida fishery was maintained by natural growth of native shrimp. (3) A winter offshore movement in Georgia of the more developed shrimp. (4) A combination of any two or all three of the above possibilities. The regular and recurrent nature of these phenomena leads us to believe that migration is probably the most important factor influencing them.

Measurements were made by Mr. Lindner in an attempt to determine whether or not differences in body proportion existed which would make possible the identification of shrimp as to point of origin. It was found that although racial differences do seem to occur in the shrimp, possible intermingling and probable seasonal and environmental changes in body proportion have made it impossible to interpret these data without experimental studies.

Tagging experiments were conducted on confined shrimp at Aransas Pass, Tex., by Mr. Mosher and Mr. Lindner in order to determine the feasibility and best means of marking. These experiments showed that the celluloid disc type of tag affixed to the first abdominal somite of the shrimp was most probably the best method as it apparently interfered less with movements and molting, and was retained better than other devices. During September, October, and November this method was placed in practice in the field by Mr. Lindner and Mr. Anderson. A total of 3,800 shrimp were tagged along the Georgia and Florida coasts.

The success of this method of tagging is evidenced by the fact that by the end of December almost one-fourth of the tagged shrimp had been taken by the fishermen and returned to the investigators. Although these experiments are by no means completed it is quite evident that there does occur a southward movement of shrimp from Georgia into Florida during the fall and winter. Some of the tagged shrimp had moved distances upwards of 200 miles. The success of the Florida winter fishery probably thus depends to a large extent upon the production of shrimp in Georgia, and upon these shrimp escaping the Georgia fishermen. The numerous returns indicate that the fishery is very intense. The importance of continuing these studies is obvious.

During the coming year tagging operations will be extended throughout the entire area of the South Atlantic shrimp fishery in order to determine whether there is a return movement of shrimp from Florida to Georgia in the spring, and also to discover the direction and extent of the migrations along the North and South Carolina coasts. Data have been collected which indicate that there may also be a winter concentration of shrimp in the vicinity of Cape Hatteras. In addition, arrangements have been made for securing a pond in the vicinity of Brunswick, Ga., where experiments can be conducted to determine the mortality owing to tagging. From these experiments, and from the tagging returns it is hoped that some conclusions can be derived as to the actual intensity of the fishery.

It is evident from data gathered in Louisiana and Texas that the Gulf shrimp also are migratory. Throughout the fall and winter it is customary for the majority of large shrimp to disappear from

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the usual coastal fishing grounds. Evidence has been secured which leads to the belief that during the winter the shrimp move offshore to the deeper and warmer waters of the Gulf. With suitable vessel equipment, which this investigation does not now possess, it should be possible, through extensive fishing during the fall and winter in the offshore waters, to determine whether or not this is the case and also whether or not the shrimp congregate in sufficient quantities in these areas to make a commercial fishery feasible at this time.

In Texas during the coming year, if arrangements can be made, intensive tagging experiments will be conducted over the entire fishing area. It is hoped through marking experiments to be able to determine the intensity of fishing, particularly in Corpus Christi Bay. It is also probable that at the same time valuable data will be secured on the coastal or offshore movement of the Texas shrimp.

## GREAT LAKES FISHERY INVESTIGATION

JOHN VAN OOSTEN, *in charge*

As in 1934, virtually no field work was conducted on the Great Lakes during the calendar year 1935. F. W. Jobes spent 1 week in February at Put in Bay, Ohio, obtaining a collection of young perch from the Ohio Division of Conservation, and Dr. Van Oosten spent 1 week in July at Port Huron, Mich., observing the whitefish catch in deep trap nets with special reference to the percentage of undersized fish taken in waters less than 80 feet deep.

The Bureau maintained its cordial relations with the various Great Lakes States, and provided considerable assistance in drafting and revising fisheries legislation and submitting pertinent data. Ohio submitted 5 bills affecting commercial fisheries; Michigan, 13; and Wisconsin, 12, one of which involved the complete recodification of its laws governing the Great Lakes fisheries.

Dr. Van Oosten represented the Bureau at 10 conferences and meetings during the year, and at some of these presented papers.

### FISHERY STATISTICS

A major project undertaken without benefit of precedent was the initiation by the Bureau of Fisheries in 1933 of a detailed statistical study of the Great Lakes fisheries in waters under the jurisdiction of the State of Michigan, based on reports of daily fishing activity submitted at the end of each month by all licensed fishermen represented. The Great Lakes fisheries present so many peculiarities that the statistical methods employed in the study of other fisheries are, in general, not applicable. The consequent necessity for the development of special methods adapted specifically to the investigation of Great Lakes fisheries made it imperative that the first analyses and tabulations of statistical data be carried out in the minutest detail. The task was made the more onerous by reason of the fact that the compilation of the statistics of 3 earlier years (1929–32) had to be made in addition to that of the statistics of the current year. The basic tabulations of statistical data have now been completed for all Great Lakes waters under the jurisdiction of the State of Michigan

for the 6-year period, 1929–34. In addition, detailed statistical summaries for the different calendar years have been prepared for the Michigan waters of Lake Huron, Lake Erie, and Lake Michigan for the same period.

Progress in the statistical study of the Great Lakes commercial fisheries during 1935 has by no means been limited to bringing tabulations of original data up to date. The modification of methods of procedure, and the detection of sources of error have added much to the reliability of the statistical results. As an illustration, it may be mentioned that the original geographical boundaries of some of the statistical districts proved unsatisfactory and had to be revised. A more unusual difficulty was that presented by the discovery of numerous misstatements relative to the type of gear employed. A serious distortion of the statistics of the fishery (particularly the whitefish fishery) was avoided only by means of a detailed study, requiring several months, of the fishing activities from month to month of individual fishermen and individual vessels. Conclusions drawn from these studies were carefully substantiated from other sources.

Attention has been directed also toward the critical examination of the basic assumption and definitions upon which the original methods of procedure were founded. In this connection the observations on the relationship between fishing time of stationary gear and size of lift are particularly striking. Doubling the amount of time that gear is fished before it is lifted does not double the catch, but on the average increases it only 10 to 20 percent. This relationship together with the fact that the average fishing time for a given type of gear fluctuates within narrow limits from year to year in a single fishing area may make it possible to dispense entirely with fishing time in the treatment of statistical data. Certainly the earlier definition of the "catch per net per night" as the most discriminating measure of abundance will require modification.

In order that annual fluctuations in the abundance of each species in a given area may be expressed more concisely, effort is being directed toward the development of a method of expressing these fluctuations in terms of index numbers. The index number is derived through the comparison of the actual catch of a given species for a given year and in a certain locality with the "expected" catch as computed from the known intensity of the fishery.

## PIKE PERCHES

A manuscript dealing with various phases of the economics, life histories, and racial affinities of the pike perches (Stizostedion) of Lake Erie has been partially completed by H. J. Deason. Many conclusions resulting from this investigation have been presented previously in Progress in Biological Inquiries for the years 1933 and 1934. Additional conclusions have been reached in 1935.

The male and female saugers grow at approximately the same rate for the first 3 years of life while in the yellow pike perch, the same relative growth rate extends through the first 4 years of life, following which the females of both species grow more rapidly than the males.

A mathematical expression of the length-weight relationship in terms of the formula $y = ax^n$ has been obtained for each of the three species; namely, sauger, yellow pike perch, and blue pike perch. The weight of each species tends to increase approximately as the 3.15 power of the length. (A slightly different value was obtained for each of the three species.) The "relative heaviness" or "state of well-being" of the pike perches, as expressed by a coefficient of conditions, $K$, obtained by the formula

$$K = \frac{W.10^{-5}}{L^3}$$

has been found to vary with the length of the individual, with sex, and according to the season of the year. No variation with respect to locality was found.

A history of the pike-perch fishery of Lake Erie has been completed. Sources include publications of various United States and Canadian agencies as well as valuable unpublished records obtained from certain commercial fishermen of Lake Erie.

### YELLOW PERCH

Virtually all of the available data collected during the years 1927–32 on the age and growth of the yellow perch have been drawn up in summary tables. The growth data (lengths and increments), based largely on the measurements of scales, have been analyzed with respect to age groups, year classes, sex, and localities. Age composition of the commercial catch has been ascertained with respect to both seasonal fluctuations and locality. Individual weights of approximately 18,000 yellow perch have been tabulated by 5 millimeter frequency intervals and have been subjected to analysis with respect to type of gear, size of mesh, seasons, sex, sexual maturity, and locality. Length frequencies were compiled to show variations with respect to gear, seasons, and locality. The work on the yellow perch was discontinued in June when F. W. Jobes was transferred to the Washington office.

### CURRENT PROJECTS

Current projects involve largely the writing of reports covering the major investigations completed in the field. Such projects include the 5-year investigation on Lake Erie; the 2-year survey of deep trap net operations on Lakes Huron and Michigan; the three seasons' work on the chub nets of Lake Michigan, including studies on temperature and currents; and life histories of the whitefish of Lakes Huron and Erie, the cisco of Lake Erie, the sheepshead of Lake Erie, the chub of Lake Superior, and the herring of Lake Huron.

## PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

FREDERICK A. DAVIDSON, *in charge*

The Pacific coast and Alaska fishery investigations were confined mainly to studies of the salmon fisheries in the Pacific Northwest States and the salmon and herring fisheries of Alaska. The major investigations of the salmon and herring fisheries conducted in these

regions in 1934 were continued during 1935. In addition, a new and much-needed investigation dealing with the collection and statistical analysis of daily catch records of the various types of fishing gear used in the salmon fisheries of Alaska was carried on in 1935.

### COLUMBIA RIVER

The investigation of the fisheries of the Columbia River was conducted during 1935 by J. A. Craig, assisted by A. J. Suomela. The activities of this investigation can be summarized under several divisions, each forming a part of the general program for the acquisition of facts essential to the preservation of these important fisheries.

One of the phases which is of fundamental importance is the study of the annual and seasonal fluctuations in the abundance of the important species of fish contributing to the Columbia River fisheries. These fluctuations are being ascertained from a statistical study of the catch records of individual pieces of gear employed in the commercial fishery. Records have been made available through the cooperation of the commercial fishing interests on the river, and some of them extend back as far as 1897. All of the original records of the catches of all important commercial species, namely, chinook, blueback, chum and silver salmon, steelhead trout, and sturgeon, made with gill nets, traps, and seines, have been copied from 1897 to 1934, inclusive. Since the chinook salmon are by far the most numerous and important species frequenting this river system, indexes of their abundance are being computed first. Practically all of the gross tabulations and summaries of these data have been completed within the year.

Another major division of this investigation is the stream survey program. The object of these surveys is to obtain data which will be a guide to the improvement and rehabilitation of the spawning areas in the Columbia River system.

In the course of this work field parties secured information on (1) the total area in each tributary which forms the present and past spawning areas for migratory species of fish; (2) the location of the spawning areas now available to salmon; (3) the location of the areas which have been made unavailable to salmon, and the cause of their destruction; (4) the sources of pollution which may be detrimental to spawning populations of salmon and to resident fingerlings; (5) the number and location of irrigation canals and their effect on migratory fishes; (6) the location of natural and artificial obstructions, and the extent to which these form barriers to upstream migrants; (7) the general status of the salmon populations in the Columbia River.

During the present year, 1935, the survey has progressed satisfactorily, especially so from the advent of summer to the close of the year. The activities have been concentrated principally in eastern Washington on tributary streams below Grand Coulee. The streams on which surveys have been completed are: Methow, Entiat, and the Wenatchee. The Okanogan has been partially surveyed. In the Yakima system the tributaries examined to date are as follows: Naches River with its tributaries, namely, American River, Bumping River, Rattlesnake Creek, and Tieton River; and Ahtanum Creek, Satus Creek, Kachess and Cle Elum Rivers, which empty

directly into the Yakima River. In the southeastern section of the State of Washington partial surveys of the Walla Walla River, Mill Creek, and Asotin Creek have been made, and the examination of the Touchet and Tucannon Rivers is finished. Surveys of Alochoman and Wind Rivers in the lower Columbia are under way, while the Washougal River survey was completed. A total of 1,100 miles of tributary streams was surveyed during the year.

Because of the fact that all of the salmon and steelhead trout which reach Grand Coulee Dam after its completion must be artificially spawned and their offspring cared for in a hatchery, it became necessary to know the numbers and species of these fish migrating past the dam site so that proper hatchery facilities could be provided for them. In connection with this problem, counting weirs were installed in both fish ladders of the Rock Island Dam of the Puget Sound Power & Light Co. Observers were stationed there to count the fish during the entire year. The total numbers of salmon and steelhead trout passing over this dam in 1935 were: Chinook salmon, 16,310; blueback salmon, 14,013; silver salmon, 11; and steelhead trout, 5,412. This counting was done in cooperation with the Washington State Fisheries Department.

A counting weir was maintained in the fish ladder of the Tumwater Dam on the Wenatchee River during the late summer and early fall when the blueback salmon were ascending that tributary. During that time 889 blueback salmon, 4 chinooks and 7 steelheads ascended the ladder. Another counting weir was operated at Oroville, Wash., where 10 chinooks and 264 blueback salmon were counted. From surveys made of spawning grounds, records of the Indians' catches at Kettle Falls, and other sources of evidence, it appears that the majority of the fish counted over the Rock Island Dam go on past the Grand Coulee dam site and seek spawning grounds largely in British Columbia. Fortunately, a great deal of work on the life history and habits of the salmon of the Columbia has been done (by Rich, Holmes, and others) thus making that phase of the investigation seemingly less pressing than some of the others. However, every opportunity was taken advantage of to secure material for such work. Large collections of the migrants, both salmon and steelheads, were made in the Yakima River, and scales were taken from steelheads and salmon at the Rock Island and Tumwater weirs.

The investigation of the mechanism of the homing instincts of the blueback or sockeye salmon, initiated before Mr. Craig was transferred to the Columbia River work, was continued. Ten thousand sockeye migrants in their second year were marked and liberated in Diobsud Creek, a tributary of the Skagit River, as a check on the extensive marking experiments of 1934 in that system. The first returns from these experiments are expected in the fall of 1936.

In order to have a complete understanding of the fishery problems of the Columbia River system, it has been necessary to do a considerable amount of research on the history and development of these fisheries, and on the development and utilization of other natural resources such as water power, agricultural land, and forests which have influenced the fish populations by bringing about changes in

their habitats. A report on this part of the investigation is now in the process of preparation.

As a result of cooperative work between the United States Bureau of Fisheries and the Washington State Fisheries Department, evidence was collected and presented which indicated the necessity for a third fish ladder at the middle of the Rock Island Dam on the main Columbia River. This ladder is now being constructed and will be in use during the summer of 1936.

### PUGET SOUND SOCKEYE SALMON

Since the publication in March 1935, of the preliminary report on the salmon fisheries of the Puget Sound-Frasier River region by Dr. George A. Rounsefell and George B. Kelez, entitled Abundance and Seasonal Occurrence of the Salmon in the Puget Sound Region and the Development of the Fishery,[6] the sockeye investigation has been concerned largely with obtaining sufficient data to clarify many of the points only hinted at in the preliminary study. The collection of statistics on the catches of fish traps and seines in Puget Sound was continued in cooperation with the coho investigation. Special efforts were made to obtain sufficient purse seine data covering the fall months, and considerable success was achieved.

The records of daily catches were obtained for over 76 percent of the salmon traps operated during the past 20 years, and a considerable percentage of all of the traps operated since 1895. These data are being tabulated so as to show the seasonal occurrence of all species of salmon in each of the main fishing areas. Furthermore, the total annual catches made by each of the traps since 1915 have been ascertained, thereby making available the quantities of salmon taken in each area.

The sockeye investigation has obtained records of individual daily catches by gill nets on the Fraser River of all species of salmon throughout each season from 1898 to 1935. Preliminary analysis of these data has shown distinct differences in the efficiency of Japanese, white, and Indian fishermen. Records have been obtained of all the licenses from 1900 to 1935, and these are being studied to discover the variations in numbers of each of these three classes of fishermen.

The Division of Fish Culture has cooperated with the sockeye investigation by planting 76,000 fingerling sockeyes from the Birdsview hatchery in Cedar River, a tributary of Lake Washington; and another 76,000 in Issaquah Creek, a tributary of Lake Sammamish, which empties into Lake Washington through the Sammamish River. These two lakes appear to be the most suitable in the Puget Sound region of the State of Washington for the establishment of sockeye salmon. At present they both support runs of coho salmon.

During the 1935 season biological data were collected from the commercial catches of sockeye, pink, and chum salmon from various areas within Puget Sound as well as from Swiftsure Bank. From July 22 to November 20, scales and length measurements were taken on 55 samples of sockeyes comprising 2,529 fish. Weights were taken

[6] Special Report, Washington, 1935 (multigraphed).

on 2,229 of these. The same data were obtained on 1,430 chum salmon in 36 samples. Length and weight data were taken on 830 pink salmon in 17 samples.

Considerable attention has been given to tracing the early history of the fishery so as to be able to utilize past experience on the effect of the fishery on each species in deciding what effects to expect in the future.

### WASHINGTON COHO SALMON

The coho salmon investigation on Puget Sound, the purpose of which is to determine the life history of the species, changes in its abundance together with their underlying causes, and methods of rehabilitating population in streams now barren or depleted, was continued during the past year under the direction of George B. Kelez.

A continuous series of fingerling collections was made in McMillin Creek to determine the rate of growth of the fish from the time of hatching until the time of seaward migration. Because of differences of temperature as great as 10° C. between various streams of the region at the same time in the summer, a series of samples was taken from all major streams and tributaries during the last week in June. A preliminary analysis of this material shows a size range from 34 to 59 mm with a mean of 40 mm in the colder streams, and a range from 48 to 71 mm with a mean of 60 mm in the warmer ones.

Two marking experiments were undertaken this season on Voight Creek, a tributary to the Puyallup River, in the southern part of the region. The fingerlings used were provided through the cooperation of the Washington State Department of Fisheries. In the first experiment, 50,000 fingerlings reared from eggs taken in November and hatched during February 1934 were marked by the removal of the dorsal and right ventral fins. The fish marked each day were held 24 hours to determine any loss due to handling and were liberated in the stream. This marking was carried on during the period from May 13 to May 19, 1935. For the second experiment, 25,000 fingerlings of the same age hatched and reared at the State hatchery on the Green River were moved to Voight Creek and marked by the removal of the adipose and both dorsal fins. The lots of fish marked each day were held for 24 hours in the stream and then liberated. This experiment was carried on between May 28 and June 3, 1935.

The first experiment is expected to furnish information on certain phases of the life history of the coho salmon such as the "homing instinct", migration routes, and time of appearance of this particular run, through recoveries of adult fish both from the commercial fisheries and from the stream itself during the spawning run. The second experiment is intended to determine the success of transplanting coho salmon of the fingerling size in a stream entirely separate from that of their nativity. Adult fish resulting from the fingerlings transplanted to Voight Creek must pass the mouth of the more northerly Green River, their native stream, before reaching the mouth of the Puyallup. If the tendency is to return to the Green River they will be taken at the hatchery rack there; the proportion returning to the Puyallup will indicate the success of transplanting fish of this size.

The first recoveries from a similar set of experiments carried on in 1934 at the Samish River, in the northern region of the Sound, were made during the spawning migration of the present season. Six of these fish, returning as grilse from the marking of November 1934, were recovered with a dip net at the Samish rack. One was reported as taken by a sport fisherman below the rack, and several others escaped, being small enough to pass through the rack. No returning grilse were observed from the earlier Samanish experiments, those of May 1934.

Collections of biological data from both commercial and sport fisheries were made throughout the season. Scale samples and data as to length and sex were taken for over 3,000 fish obtained from the commercial fishery between July 22 and November 20, when the fishing season closed. Weights taken from 2,700 of these fish indicated an exceptional growth during the third year of their lives. Scale samples and measurements were also obtained from several hundred fish in their second year taken by sport fishermen.

The collection of data was continued on individual catches by all types of gear on Puget Sound since the beginning of the fishing industry there. Almost all the material of this nature still in existence has now been obtained from the records of the industry. This is being analyzed to determine changes in abundance, time of runs and the importance of the various fishing areas.

### KARLUK RIVER RED SALMON

An investigation of the red salmon runs of the Karluk River, Alaska, was continued by J. T. Barnaby, assisted by L. D. Townsend and J. F. Hart.

Another marking experiment was initiated, 49,092 seaward migrants being marked by the amputation of the left ventral and adipose fins. The returns from various marking experiments have ranged from 20 to 25 percent of the migrants marked. Thus the ocean mortality from seaward migrant stage to adult stage is apparently about 75 percent. If we assume the return of only two adults for each spawner, the assumption upon which the existing statute limiting the commercial catch to 50 percent of the total run is based, and if we assume that each female produces the known average of 3,500 eggs, the mortality during the fresh water period, or from eggs to seaward migrants may be calculated under these conditions to be 99.54 percent.

Since the greatest mortality of this species takes place during the fresh-water period of its life history, further studies were made on the environmental factors which influence the success of each year's spawning. Physical and chemical data were collected throughout the summer. The chemical analysis of the lake and stream waters indicates that phosphorus and silicon are limiting factors in the production of plankton, at least during the major part of the summer. The water of the streams entering the lake contained on the average 2 one-hundredths of a milligram of phosphorus per liter, and over 8 milligrams of silicon per liter. The phosphorus content of the lake water during June, July, and August remained at zero and the silicon content of the lake water was 1½ milligrams per liter in June, a trace in early July, zero in late July, and a trace in August. Thus the phosphorus and silicon were being used up as fast as they became available

to the phytoplankton in the lake. Samples taken on September 6 showed 6 one-thousandths of a milligram of phosphorus, and one-half a milligram of silicon per liter. Plankton samples showed less plankton in the water than was present earlier in the summer. Thus some other factor, probably the amount of light, was acting as a limiting factor at this time, and was allowing the gradual accumulation of phosphorus and silicon in the lake water.

Other fish inhabiting this lake naturally have some effect on the population of young red salmon. Present in the lake are young silver and king salmon, a small population of young steelhead trout, cottoids, sticklebacks, and Dolly Varden trout. It is considered that only the two last-named species may have an important effect on the survival of the red-salmon fingerlings. The sticklebacks, due to their abundance, are possible competitors for food, and the Dolly Varden trout are predators. Dolly Varden trout were caught in a gill net, at all depths down to 52½ meters (175 ft.). Salmon eggs were found to be present in the stomachs of trout taken in depths down to 46 meters (151 ft.) indicating that these trout alternate between shallow and deep water in a relatively short period of time, or else that red salmon may spawn in deeper water than previously supposed. Adult red salmon were taken in the net in depths down to 41 meters (134 ft.) and appeared to be quite abundant in depths down to 24½ meters (80 ft.). Of the trout caught between July 19 and July 30, stickleback eggs and snails were the main articles of diet, salmon eggs making up only 7.5 percent of their food. Of the trout taken between August 17 and September 9, salmon eggs made up 35 percent of the diet, with sticklebacks and snails next in importance.

Trout take a heavy toll in the early spring when the salmon fry are migrating down stream into the lake. However, stomach contents of trout taken during the summer months showed very few remains of salmon fingerlings, none being found in the July samples, and only 1.2 percent in August and September.

Data on the returns from known escapements were collected, escapement and catch records were compiled, and scale samples taken throughout the season for the purpose of age determination. Complete returns from the 1929 spawning are now at hand with the exception of the few 7-year fish which will return in 1936. The 1929 escapement was 900,519 and the return per fish from this escapement will be approximately 1.6 to 1.0, as compared with 2.2 to 1.0 for the 1928 escapement and 1.8 to 1.0 for the 1927 escapement. There is considerable evidence toward the belief that these returns are below normal and are, in the main, caused by unfavorable environmental conditions existing in Karluk Lake during the time these fish were residents there.

### CHIGNIK RIVER RED SALMON

This investigation was continued in 1935 on a much reduced scale. As in 1934 a temporary assistant was stationed at Chignik from May until October for the purposes of collecting fish scale samples, and of observing the commercial catches for marked fish. The data collected have been filed for future use.

## PINK SALMON

The activities of this investigation in 1935, as in past years, were confined mainly to the study of the pink-salmon populations of southeastern Alaska. Although the pink salmon are found in practically all of the waters of Alaska they are most abundant in this section. The salmon populations that support this fishery spawn in hundreds of streams, varying greatly both in size and character of habitat. Hence it is believed that the fundamental facts secured from the study of the fishery in this section may be applied generally to the pink-salmon fisheries of Alaska. Dr. Frederick A. Davidson is conducting this investigation, assisted by S. J. Hutchinson.

Studies were continued on the factors responsible for the fluctuations in the abundance of pink-salmon populations that spawn in the stream at Little Port Walter, Alaska. A counting weir has been maintained in this stream during the past two seasons. In the summer of 1935, 6,075 pink salmon were tallied through the weir on their migration upstream to the spawning grounds. Samples of this run of salmon were taken at the weir throughout the migratory period. These samples were studied for the purpose of determining the sex ratio, fecundity, and racial characters of the pink salmon composing the 1935 population. Observations on the spawning grounds in the stream indicated a successful spawning of this population. During the entire year records were kept of the prevailing meteorological and hydrographic conditions that tend to influence the development and mortality of the brood. Since the study of the pink-salmon populations at Little Port Walter has been carried on for two seasons only, no returns have yet been secured from known spawning populations.

The pink salmon migrating into the stream at Little Port Walter were studied also from the standpoint of the physical and chemical changes that take place within the body during their spawning migration from the sea. This is a continuation of the cooperative study of this phase of the life history of the pink salmon that the Bureau has been carrying on for the past few years with the National Canners Association of Seattle, Wash. The results of this study provide information relative to the seasonal change in the market quality of the pink-salmon pack each year that is of primary importance to the canning industry. A preliminary report of the progress of this study up to 1935 was completed during the past year and was published as Investigational Report No. 33 of the Bureau.

Owing to the need for further information concerning the migrations of pink salmon through Clarence Strait in southeastern Alaska, a pink-salmon-tagging experiment was conducted in this area during the summer of 1935. The runs of salmon that migrate into Clarence Strait from Dixon Entrance are composed of different races that are bound for the spawning areas adjacent to the strait through the entire course of 130 miles. McLean Arm, which is approximately 8 miles above the junction of Clarence Strait and Dixon Entrance, was selected as the point for tagging. Through the courtesy of the Alaska Pacific Salmon Co., 1,900 pink salmon were tagged from their McLean Arm trap in lots of 400 and 300 each, during the weekly closed periods beginning July 27 and ending August 17.

This is the first of the salmon-tagging experiments conducted in Alaska that includes a series of consecutive taggings at one point. It is hoped by this method to secure a more detailed analysis of the migratory routes and parent localities of the pink-salmon runs that pass through Clarence Strait during the entire fishing season. The returns from this experiment have thus far amounted to more than 33 percent of the total number of tags placed on the fish. Since the pink salmon have a complete 2-year life cycle, there are two distinct populations in each stream; viz, those spawning on the odd years and those spawning on the even years. In view of this fact, it is planned to conduct a similar tagging experiment in Clarence Strait in the summer of 1936 to determine any differences that might occur in the migrations of the pink salmon that comprise the even year runs.

Although the native distribution of the Pacific salmon has been discussed from time to time by various icthyologists, no one has made a study of the environmental conditions in the different habitats in which these salmon are found. Furthermore, no attempt has been made to compare the environmental conditions found in the foreign habitats whither they have been successfully or otherwise transplanted, with the conditions in their native habitats. Such a study was started during the past season for the pink salmon and then extended to embrace all species of the Pacific salmon. It is hoped that this study will indicate some of the limiting factors that are responsibile for the geographic distribution of the salmon.

### ALASKA SALMON FISHERY STATISTICS

There has been an ever growing need for an investigation dealing with the collection, compilation, and biometrical analysis of the daily catch records of the various types of fishing gear employed in the Alaska salmon fisheries. These records form the basic data for studies concerned with changes in the abundance and character of the salmon runs, and the competition between the various types of fishing gear. It is through such studies that the conservation of the salmon runs is assured for they provide the factual basis for the proper regulation of the fisheries.

Through a cooperative arrangement between the Alaska Division and the Divisions of Scientific Inquiry and Fishery Industries, funds were made available for the establishment of this investigation during the past year. Leroy Christey, who has had experience in fishery studies of this type, was employed to take over the duties of the investigation under the direction of Dr. Davidson.

In 1927–28 the daily catch records of a large number of salmon traps in southeastern Alaska were collected and studied for the purpose of providing information concerning the delimitation of the fishing districts and closed seasons for fishing in each of the districts in this region. This study was resumed in 1930 as a part of the pink-salmon investigation, and since then effort has been made to continue the collection of such records which have provided information for the further delimitation of the fishing districts and closed seasons for fishing in this region.

Since this study was carried on as a part of the pink-salmon investigation, time and funds were not available to make a comprehensive collection and study of all the trap catch in southeastern Alaska.

Hence one of Mr. Christey's first accomplishments in this new investigation was to make a thorough and exhaustive search for all data previous to 1930. Effort was made to contact all packing companies operating at the present time or in the past. While the catch records of some liquidated companies have been detroyed, sufficient data have been obtained to insure an adequate sample from 1907 to the present date. In addition to securing old records, it has been possible to contact the trap operators and impress them with the value of this work. The daily catch record was secured for each trap fished in southeastern Alaska in 1935.

As time permits, this work will be expanded to include other Alaska fishing areas. Considerable trap catch data have already been acquired for Prince William Sound, including complete returns for 1935. Some trap catch records also have been secured for Cook Inlet, and areas on the Alaska Peninsula. It is hoped that this work may be expanded to include the study of other units of fishing gear, especially the gill-net fishery of Bristol Bay.

### HERRING

The herring investigation, under the direction of Edwin H. Dahlgren, was continued during the past year. The efforts of the investigation were again concentrated in southeastern Alaska, where the most productive and intensive fishery is carried on. The principal aims of the investigation are to delineate the areas inhabited by each of the major stocks of herring which comprise the total population of the area, to evaluate the relative abundance of each of these stocks, and to seek causes for the fluctuations in abundance which are known to occur.

The tagging program, begun in 1932, was continued. This tagging has a two-fold purpose; first, to delineate the areas inhabited by each of the major populations of herring; and second, to obtain a measure of the intensity of the fishery by considering the percentage of tags recovered. During the spring spawning season, tagging was carried on at Craig, on the west coast of Prince of Wales Island, and in the vicinity of Sitka, on the west coast of Baranof Island. As in the 1934 experiment, a large number of individuals were tagged in order to obtain more reliable estimates of the mortality imposed by the fishery. During a 3-week period 13,008 individuals were tagged at Craig; 20,157 at Sitka; 5,141 at Kalinin Bay, 25 miles north of Sitka; and 2,613 at Redoubt Bay, 15 miles south of Sitka.

The recovery of the tags affixed at Kalinin Bay and at Redoubt Bay, along with those affixed at Sitka show that these populations intermingle on the Cape Ommaney feeding grounds, and comprise a single stock of herring. The recovery of 86 tags affixed at the Sitka area, as well as 74 tags affixed at Craig, from Warren Channel, confirmed the findings of the previous year that there is an intermingling of Craig and Sitka fish in this area. On the other hand, failure to recover Craig tags in the Cape Ommaney region, leads to the conclusion that there is no counter migration of Craig fish to Cape Ommaney.

A method for the detection of the tags to supplant the present magnetic recovery system was tried out during the season—a method whereby the individual bearing the tag may be selected from the

large number of herring passing through the shore stations. The device is dependent on the bridge-circuit principle, in which the presence of the metal passing through the coils creates an unbalance which may be converted into a power impulse to eject the individual bearing the tag. The instrument proved feasible, and 66 tags were recovered during the season. The advantages of the device lie in the facts that it is possible to determine with greater accuracy the origin of the tags; to better evaluate the mortality imposed by the fishery; and by examination of the individuals bearing the tags, to determine the effect of the tags on the host.

There has always been a question as to how large a percentage of the population is taken by the fishery. The popular belief has been that only an immeasurable part is caught, and that the decline in abundance observed in certain intensively fished areas has been due entirely to the emigration of herring from that region.

Assuming that the tagged fish are distributed with the remainder of the population in a random manner, which appears to be the case from the fact that tags are returned from the various separate markings (throughout a greater part of the season), then the percentage recovery of tags gives a measure of the percentage of the total population taken. The figures herein given are admittedly in error, and represent the absolute minima of imposed mortality. There are three known sources of error which, at present, cannot be evaluated. First, there is probably a mortality caused by the tagging; second, there may be a loss of tags by their working out of the fish in life; third, there is a failure to obtain all the tags recovered by the fishermen due to inefficiency of the magnets, the loss of tags to souvenir hunters, etc.

Without considering these sources of error, however, it it evident that the fishery takes a considerable toll from the populations in the more intensively fished areas. That this is the case in the Cape Ommaney fishery is evidenced by the recovery of 101 or 4 percent of the Sitka tags in 1933; 482, or 4.4 percent in 1934; and 1,628 or 7.2 percent in 1935. The second main stock from which the fishery is drawing is that which spawns at Craig. For this fishery a 2.0 percent return (149 tags) in 1934, and a 2.3 percent return (233 tags) in 1935, indicates that this stock is not as intensively fished as is the Sitka population. These figures represent the recoveries of only one type of tag—others have been experimented with in an attempt to find the most suitable type possible.

For the past few years, 70 to 85 percent of the entire catch for southeastern Alaska has come from the Cape Ommaney region. There was a marked decline during 1935 in the catch per unit of effort in this area. This decline is accounted for by the failure of the normal increment of 4-year-olds to enter the catch. The catch for 1934 was dominated by the 4-year-olds from the brood year 1931; during that year they represented approximately 66 percent of the catch. The next year, however, owing to the failure of the new class of 4-year-olds to appear, this same 1931 brood furnished 89 percent of the catch; while the 1932 brood year, entering the catch for the first time, constituted only 3 percent of the catch. Thus the 5-year-olds, a class which had already been subjected to intensive fishing during one season, and suffered the inroads of

natural mortality, was not sufficiently abundant to maintain the catch on a high level of abundance.

With the spawning areas contributing to each feeding area known, it will be possible to estimate the abundance, and the size composition of the catch to be expected during the following season, by sampling the age composition of the spawning population during the spring. Thus, for the Sitka population, unless the new recruits entering as 4-year-olds in 1936 are relatively very abundant, the present low level of abundance may be expected to continue. This information will prove invaluable in providing for a stabilized fishery by permitting the formulation of regulations to spread the fishing intensity over the populations best able to withstand the strain.

### INVESTIGATION CONCERNING THE PROTECTION OF MIGRATORY FISH AT THE BONNEVILLE DAM

Satisfactory progress has been made in the problem of providing suitable fishways at the Bonneville Dam. The work has continued under the direction of Harlan B. Holmes, assisted by Henry F. Blood, both of whom have had the temporary assistance of other biologists and engineers. The work has been conducted in close cooperation with the staff of United States Engineers and the State fish and game departments. The program and results of the first year's activities are briefly related in Progress in Biological Inquiries, 1934.

Formal recommendations were submitted to the War Department by the Commissioner of Fisheries in August 1934. After prolonged consideration the War Department approved a plan of fishways that for the greater part followed the recommendations of the Commissioner of Fisheries. Some features that the Bureau's staff had not considered essential were added. The collecting systems for attracting and directing the fish to the fishways in the main channel were materially reduced.

The detailed designing of the fishway is being done by the staff of United States Engineers. The staff of the Bureau of Fisheries has remained in close contact with the Engineers, and has found occasion to offer suggestions.

The progress of construction of the dam has been carefully followed with the view of assuring the free passage of fish during the period of construction. Although the skeletal structure of the powerhouse, which obstructs one channel of the river, and the base of one-half of the spillway dam, which will obstruct the main channel, are nearing completion, as yet there has been no interference with the passage of fish. It was anticipated, however, that temporary fishways will be required during the latter stages of construction. A study of the anticipated condition has been made and temporary fishways have been designed.

An extensive study was made of the injury to fish in passing through water turbines. Preliminary results of the investigation indicate that there is a tremendous variation in the conditions presented by different plants, with the result that some certainly could not be passed by even the smallest fish, whereas others may cause little or no injury. The Bonneville turbines are judged to approach

the latter. It therefore has not been considered necessary to install means of preventing the seaward migrating fingerlings from entering the turbines.

A study also was made of means of directing the route of travel of migrating fish in places such as the rapidly flowing water discharging from the spillway gates and power wheels. Particular attention has been given to the electric fish diverter. The nature of electric fields produced by various means of applying electricity to the water have been studied in the laboratory. The more favorable of these soon are to be applied in field tests.

## SHELLFISH INVESTIGATIONS

PAUL S. GALTSOFF, *in charge*

The scope of the shellfish investigations was greatly enlarged by a special appropriation of $100,000 for the study of oyster pests, and the development of practical methods of their control in the Atlantic and Gulf States. The investigations on oyster and hard clam culture were continued in the waters of New England, South Atlantic States, and Puget Sound. A special allotment of $20,000, to be spent over a period of 18 months, was provided by the P. W. A. for a study of the failure of oyster culture in York River, Va., allegedly caused by pulp mill wastes. All the work has been carried out by the regular staff of the Bureau of Fisheries augmented by 20 temporary investigators, and 50 assistants whose period of employment varied from 3 to 9 months. Splendid cooperation was received from the various States, the P. W. A., and transient rehabilitation camps which supplied about 110 relief laborers for the field investigations.

### OYSTER-PEST CONTROL PROJECT

The oyster-pest investigations comprised three major problems: (1) the starfish infesting the waters of New England and the North Atlantic States; (2) the drill, in the Delaware and lower Chesapeake Bays and occurring as far south as the Gulf of Mexico; and (3) the so-called leech, the recent outbreak of which has wiped out extensive areas of oyster producing bottoms in Florida. The problems of the destruction caused by the boring sponge and the borer, although of lesser importance, were also included in the program.

Practical methods that can be used by the oyster industry for the control of these pests must be based on a thorough knowledge of their life histories, and an understanding of their habits and activities. The applicability of control methods must be determined by large-scale experimentation.

In order to provide for efficient management of these investigations the entire Atlantic and Gulf area has been divided into sections with centers at Woods Hole, Mass.; Wickford, R. I.; Milford, Conn.; Bivalve, N. J.; Solomons, Md.; Beaufort, N. C.; and Apalachicola, Fla.

*New England section.*—Under the direct supervision of Dr. Galtsoff, studies of the starfish and drill along the Massachusetts coast were begun in June. Surveys were made to determine whether the

sudden appearance of large numbers of starfish is due to invasion from other territories or to the increased propagation of the local stock. Both field and laboratory work were carried out by Dr. K. S. Rice, Charles F. Reppun, and George Mishtowt.

There is no indication that starfish migrate during cold weather, their distribution over the bottom of Buzzards Bay being more or less constant with only small changes during the various seasons. The greater concentrations were found on the New Bedford side near the head of Buzzards Bay. The comparatively small number of starfish now found in the bay is perhaps due to the combined efforts of various town and State authorities who, with the help of Federal relief grants, succeeded during the past 2-year period in removing 173,300 bushels of starfish, or about 52 million adult organisms.

From laboratory experiments on the chemical control of this pest, in which 22 various inorganic substances were used, it seems evident that from every point of view, copper sulphate is the most satisfactory poison for killing starfish. In comparative ease of application, low cost, small effective concentration, rapid diffusion, and quick action, it is superior to other toxic substances that can be used in the sea. Under laboratory conditions it was found to be effective in great dilutions in killing starfish. Experiments were made to develop a copper-glue compound jelly which, placed on an oyster bed, would slowly diffuse, creating for a short time a concentration of copper sulphate sufficient to kill starfish, finally clearing itself completely, leaving none to injure the oysters. Earlier work with copper showed that its combination with a protein in order to produce a slow diffusion in water is lethal to starfish, but harmless to oysters within the time limits chosen. However, further experiments will be required in order to ascertain the most favorable concentration for practical purposes.

During the summer laboratory studies were conducted on the feeding habits and oviposition of the oyster drill, *Urosalpinx*. It was found that oysters, both young and adult, mussels, scallops, clams, barnacles, and some other mollusks are all used by the drill as food. *Anomia*, however, is never attacked. It appeared that barnacles are the favorite food.

Experiments in trapping drills on the rocky bottoms in the Woods Hole section proved unsatisfactory because the barnacle-covered rocks seemed to provide such an abundance of food that the drills could not be attracted by bait.

Laboratory observations indicate that there may be some correlation between the number of egg cases laid, and the amount of food available.

Attempts to poison drills with copper sulphate were entirely unsuccessful until dilute solutions were used that permitted the drills to remain open and active. This was found effective as a lethal agent when employed for a protracted time. Dilutions of copper sulphate of 0.3 parts per mille were effective in 18 days.

A survey of the Narragansett Bay, R. I., region was carried out by J. J. Hellewell with the cooperation of the Rhode Island State College which offered its laboratory facilities at Wickford, R. I., Dr. Charles J. Fish, who assisted in inaugurating the project, and

the State Commission of Fish and Game which provided a laboratory space at the State lobster hatchery at Wickford, R. I.

From the beginning of the work in July until its close in February, two extensive cruises were completed and many trips made, covering 150 stations, which, within the limits of the bay were established 1 mile apart, and at a distance of 4 miles apart in the sound. Observations consisted of dredging for starfish, recording data on temperature, salinity, depth, and the character of the bottom.

The October survey of these waters showed the starfish population to be concentrated in comparatively large numbers in two rather restricted localities near the headwaters of the middle passage. Weekly observations to detect the possible movements of starfish failed to show changes in their distribution and at the end of January the ranges of the two concentrations were much the same as in October. There was no indication of invasion of starfish from outside waters. Measurements of the starfish obtained from the two localities showed that those found nearest the headwaters of the bay (possibly an earlier seasonal production) averaged significantly larger, although the two localities were separated by a distance of only a few miles.

Winter studies show that as the temperature approached the winter minimum there was a cessation of growth, and a reduction in the rate of feeding of specimens kept in a live car. The size of these experimental animals in December coincided exactly with the mean of the stock from which they were obtained in October, indicating that the live-car records probably approximate normal conditions. As the difference in the mean size of the two groups has remained the same it is thought that the smaller group represents later production in the lower bay where seasonal warming is slower than in the headwaters, and that this group will mature and spawn at a smaller size.

The Oyster Laboratory at Milford, Conn., was the center of the investigation on the life history, biology, spawning, setting, and the migrations of starfish. The work was carried out by Dr. V. L. Loosanoff with the assistance of J. C. Lipsett, E. J. Larson, R. Nauman, A. Kammeraad, J. Piaat, R. B. Burrows, and H. Beard, and in cooperation with the Connecticut Shellfisheries Commission, which generously supplied the State boat *Shellfish* for the work in Long Island Sound.

The first survey covering 141 stations in the Sound was made in May, and was repeated during September and December. Results of field observations made during the spring, fall, and winter, show that starfish are practically limited to the shore regions of the Sound, although opposite New Haven and Bridgeport they extend some distance out into deeper waters. On the Long Island shore there are gaps at each end of Smithtown Bay and at two other eastern points where starfish appear to be absent. The longest shore gap however, is on the Connecticut shore from the Connecticut River to Guilford. Considering only the 43 stations where starfish were found, 93.4 percent in the first survey, 85.8 percent in the second, and 79.0 percent in the third, occurred in less than 40 feet of water, the greatest number being found at depths between 20 and 39 feet.

No correlation has been noticed between either the temperature or salinity of the water and starfish distribution, but the distribution is practically limited to those areas where shells are present on the bottom. Shells were found at 110 of the 141 stations, 89.9 percent of the starfish population being confined to these shell-covered areas. The greatest concentration of starfish was found in the extreme western part of the sound on the Long Island side on abandoned oyster beds, and bottoms covered with dead shells. Results of the surveys are of considerable practical importance for they disclosed the presence of great numbers of starfish on bottoms which are neglected by the oystermen.

Although a few specimens of *Asterias vulgaris* and *Henricia sanguinolenta* were found, *Asterias forbesi* is by far the predominating species of starfish found in this region.

Throughout the year the majority of starfish taken were of medium size, 2 to 5 inches in diameter, the size distribution being markedly similar for all surveys. The slight increase in the proportion of small starfish found in the winter survey is due to appearance of the 1935 crop.

Although field surveys have demonstrated a certain stability in the starfish population of this area, a direct attempt to study the movements of starfish seemed to be desirable. After experiments had shown all forms of tagging to be unsuccessful, a method of vital staining was developed and successfully employed. On November 19, approximately 15,000 starfish stained with nile blue sulphate were released at a known point in the sound. Since then extensive mappings have shown that migration is evidently slow, as in 2 months the most distant blue starfish were found only about one half a nautical mile south and west from the point of release. Five months later the starfish were still holding the blue color although a few were somewhat faded.

Laboratory studies on the condition of starfish gonads showed that in November there is an increase in gonad size, apparently in preparation for next year's spawning. In Long Island Sound the gonads appear to be mature before January, while near Woods Hole, Mass., maturity is not reached until late February or early March. It has been found that *A. forbesi* spawns when the temperature of the water reaches 20° C, provided the gonads are mature. Spawning in Long Island Sound first occurs about June 26–28, and continues until August 20.

Studies of the development of the larvae under laboratory conditions showed the larval period lasts 21 days at an average temperature of 20–21° C. Setting continued from July 15 until September 9, taking place at depths from mean low water to 70 feet.

A protozoan parasite, *Orchitophyra stellarum* Cepede, has been found in the gonads of the male *Asterias forbesi*, occurring in about 1 of every 15. It causes a great reduction in the number of spermatozoa in the follicles of the testis, often inducing total sterility. Work is now in progress to study the life history of this organism and its mode of infecting starfish.

*New Jersey and Delaware Bay section.*—The principal aim of the Bureau's work in New Jersey is the control of the oyster drills,

*Urosalpinx* and *Eupleura*, which constitute a serious menace to oyster production, causing a loss to the Delaware Bay oyster industry of approximately $1,000,000 a year.

Headquarters were established at Bivalve, N. J., with a field station at Cape May, N. J., where the State of New Jersey maintains an oyster experiment laboratory. Still another station was in operation during June, July, and August at Barnegat Bay, N. J., where studies were made on the activities of the drills with relation to changes in environmental conditions. The cooperation of the State of New Jersey, both by a generous offer of laboratory and office facilities, and by the use of its personnel and equipment, made possible a much broader and a more thorough study on the biology of the drill and the methods of its capture than would have otherwise been possible.

The work was carried out in cooperation with Dr. Thurlow C. Nelson, by Dr. Sizer, J. B. Engle, and H. H. Haskin. The State W. P. A. branch generously cooperated with the Bureau of Fisheries project by assigning 10 relief laborers for the construction and handling of drill traps, and by providing the boat for trapping experiments. Because of the seriousness of the drill problem in Delaware Bay, the work was carried out throughout the year and valuable information was recorded on the behavior of the drills during the winter months.

Two methods of controlling drills were attempted in Delaware Bay. One was the use of a chicken-wire bag trap that could be hauled to the surface at regular intervals, making use of the habit of the drill to climb upon any elevated portion of the bottom to feed and lay eggs. By using 3,500 traps for a period of 6 months, a total of approximately 1,300,000 drills were caught. To attempt control on a commercial scale, traps were concentrated in areas where tests showed the densest population. The traps were baited with young oysters and rebaited as often as needed, about once a month, and attached by snoods to a line of copper oleated rope, about 50 traps to a line. Four to six of these lines were placed at a station and tended weekly.

The other method of control developed during the course of the investigation consisted in dredging the bottoms with a drill dredge, especially designed to make it economical and available to the commercial oysterman. It is operated practically the same as an oyster dredge.

The combination of trapping with wire bag traps and the use of the drill dredge is considered a practical and efficient means of oyster drill control for Delaware Bay.

Since the knowledge of the life history and behavior of any destructive animal is essential for the operation of control measures, a comprehensive study was made of the habits, migration, and propagation of the drill.

A series of experiments was conducted on the migration of drills under varying conditions of temperature, salinity, and bottom. Results showed that drills are influenced in the direction of their migration by the position of food, that they move at a rate of at least 150 feet in 48 hours in the direction of food, and against prevailing currents. These migrations were performed over a bottom of loose sand and mud devoid of oysters or shells. The drill

proved to be active over the wide pH range of 6.5 to 9.1. At the acid and alkaline extremes a slowing up of activity was apparent.

Observations made in the laboratory during the winter months on the effects of temperature on drill movement showed some locomotion even at the low temperature of 2.2° C. The rate of feeding and consequently the destruction of oysters by the drills increases with temperature. The interval between feeding periods varies from 5 to 12 days. One drill will destroy, on the average, 0.34 oyster per week during the summer months, this estimate being lower than that reported at Beaufort, N. C. The salinities and temperature in New Jersey waters are somewhat lower than those at Beaufort, but this would probably not entirely account for the appreciable difference in rate of destruction at the two places.

Below a salinity of 10 to 12 parts per mille, the drills are inactive in boring the shells of oysters. Above this critical point there is no appreciable change in activity with the increase in salinity. Salinities between 10 and 15 and 30 and 35 reduce vitality of drills, while life cannot continue in salinities below 10 and above 35.

As a result of winter observations the following conclusions can tentatively be drawn: (1) Drills do not burrow in the mud during the cold period; (2) they do not seek cavities or empty shells as a place to hibernate; (3) they become dormant during extreme low temperatures (2.2° C or lower) and remain on the surface of the bottom.

Experiments using bivalves of equal ages as bait failed to show that the drills select those having the thinnest shells. If mussels (*Mytilus edulis*) whose shells are thinner than those of oysters are placed in a trap along with oysters as bait, the drills will attack the mussels first. It has been shown, however, that this preference is not owing to the thinness of their shell but to the fact that the meat of the mussel is preferred to that of the oyster. Consequently, mussel bait is twice as efficient for catching drills as oyster bait. Drills prefer the young spat to 1-year-old oysters, a reaction due not to the thinness of the shell, but probably to a difference in the chemical nature of the exudations of oysters of different ages.

*Urosalpinx* and *Eupleura* have been found to be equally destructive, although the latter is much more active in oviposition. This fact is especially important in view of the rapidly increasing ratio of numbers of *Eupleura* to *Urosalpinx* on the New Jersey oyster beds.

*Urosalpinx cinerea* deposits an average of 8 eggs per case and *Eupleura* sp. lays an average of 22 eggs per case. The bimodal frequency curve obtained for the number of *Eupleura* eggs per case indicated the possibility that two distinct varieties of snails of this genus were encountered. Further work will have to be done before this problem is solved. No significant variations in the number of eggs per case as related to salinity are apparent.

It has been found that adult drills can survive under environmental conditions in which they cannot reproduce. Drills placed in a trap and kept for a month in water where at low and high water the salinity varied from fresh water to 7 or 8 parts per thousand but frequently remained at or near the zero point throughout the entire tidal cycle survived, although no oviposition took place after the first week.

As noted previously by other investigators, not all of the eggs deposited develop into young drills. Study shows that approximately one-half of the eggs laid in the capsules fail to mature. Some develop into abnormal embryos and are eaten by the normal ones.

Direct evidence of cannibalism has been observed among adults, the animals having been drilled amid an abundance of oysters so that starvation conditions could not have been responsible for the attacks.

*Urosalpinx* may undergo its embryonic development in as short a time as 21 days. The fact that the egg cases under consideration were allowed to develop in their natural environment where the bottom temperature varied between 23.3 and 29.1° C. is stressed emphatically for it probably affords the explanation of the much shorter time than the 40 days in laboratory tanks at comparable temperatures, reported by another investigator as the time required for hatching. It has also been found that as many as 53 days may be required to complete development.

*Middle and South Atlantic section.*—Due to reports that the boring sponge, presumably *Cliona celata*, was a definite menace to oyster culture in Maryland waters, the Bureau undertook an investigation, assigning Dr. N. A. Wells and Dr. M. Old to study this problem. Through the cooperation of the University of Maryland, laboratory facilities were made available at the Chesapeake Biological Laboratory at Solomons, Md.; and a boat and captain were provided by the Maryland Conservation Department.

During the summer representative oyster beds in the Maryland waters of the Bay and all the major beds in the Potomac and Patuxent Rivers were surveyed. As the investigation progressed it became evident that practically all of the Maryland oyster-producing beds were free of *Cliona celata*, but many of them were infested to a greater or lesser extent with *C. vastifica*, another species of the same genus which had never been considered of importance as an oyster enemy. At only 2 of the 63 stations was *C. celata* found on living oysters. At one other station both *C. celata* and *C. vastifica* were found on shells, while the sponge at other stations was found to be *C. vastifica*.

Since there were no traces of *Cliona celata* at any salinity below 15.75, it is thought that this species will not live in a salinity below 15 parts per mille, but in order to substantiate this observation, further investigation is necessary.

The study of the distribution of *Cliona vastifica* shows that the highest percentage of infestation occurs between the salinities 11 and 13 parts per mille, although *C. vastifica* infestation is not necessarily at its highest peak wherever this salinity range is found. The lowest salinity in which this species is found appears to be 10 parts per mille while the upper limit has not yet been determined.

Heavy set and consequent overcrowding produces perfect conditions for spread of infestation. Because it is not unusual to find a large clump of oysters in a heavily infested area, entirely free of sponge, it is thought that the principal method of transmission is vegetative. In the laboratory gemmules of *Cliona vastifica* were demonstrated, occurring in every case in the marginal perforations and not in the older excavations. Among oysters taken from the

anchor chains of ships in the Patuxent River and undisturbed for many years, only 3 percent were infested, pointing to the insignificance of larval attachment.

Although heavy infestation weakens the shell, in some cases rendering the oysters unfit for market, in the opinion of some of the oyster packers and planters the sponge does not adversely affect the oyster in these waters. This does not prove, however, that the boring sponge is not a menace in other localities, particularly in the South Atlantic States where its destructive power may increase with the increase in mean annual temperature.

The work in the Middle and South Atlantic States carried out under the direction of Dr. H. F. Prytherch by William Hagen, Lloyd Garris, K. E. Johnson, G. R. Lunz, Jr., and assistants, consisted in large scale drill trapping experiments in the region from Chincoteague, Va., to Cape Charles, Va., where estimated damages caused by the drills amounted to over $150,000 annually. Also, comprehensive surveys of the distribution of oyster pests were made in the lower Chesapeake Bay and in the waters of North Carolina, South Carolina, and Georgia.

Through Paul B. Murphy, director of the Fort Eustis Camp for Transients, the services of approximately 100 transient laborers were made available for routine operations. A temporary field camp was established at Chincoteague and the U. S. S. *Kittery*, a 10,000 ton steamer, was anchored in the Onancock Harbor for use as a station ship. Six power boats were used to transport the crews from these locations to the oyster beds, where collections of drills were made by the use of traps in the case of deep-water beds or by hand-picking on exposed tidal flats.

Small wire bags baited with seed oysters, similar to those employed in New Jersey, were used. Traps attached in groups of 25 to a heavy rope line at intervals of 10 feet were fished once a week and the drills which had entered to search for food or to deposit their egg cases on the shells of the seed oysters were removed by vigorous shaking into containers aboard the boats. Experiments were carried out to determine the most effective arrangement of trap lines for removing drills from a given area, and to protect planted beds against invasion of these pests from surrounding bottoms. Over an average period of 12 weeks, 3,744 traps of various designs were used.

Trial of various methods of trap arrangement showed that the most successful and least expensive procedure for removal of drills from a given area is to anchor one end of a 250-foot trap line in approximately the center of a 4-acre unit and shift the position of the line about 45° each week. The second time that this area was trapped by the same method, the collection of drills decreased over 60 percent, indicating that the previous circuit had caused a significant reduction in the number of these pests.

Drills may likewise be collected by using parallel lines of traps which may be left stationary or moved a few feet after each weekly fishing, but this procedure involves a greater amount of labor, material, and time than the circular method. The results indicate that the use of 25 traps per acre on cleaned bottoms in Chincoteague Bay will remove virtually all of the drills in approximately 18 weeks.

Comparison of results with traps containing seed oysters and those containing clam and oyster shells showed that the former are seven times more efficient for catching these pests. A total of 80,838 drills of both species were removed from 60 acres of oyster beds, by hand picking, on the tidal flats at Wachapreague and vicinity.

Beds that have been cleaned and replanted with seed oysters can be protected against invasion of drills from surrounding bottoms by leaving an unplanted zone, approximately 20 feet wide, around the replanted area and surrounding the outer edge of this zone with a continuous line of traps set at 5- to 8-foot intervals. This method when tested on a commercial scale, showed an average collection of 5,760 drills per 25 traps over a period of 8 weeks. Subsequent examination of the seeded area showed an almost complete absence of drills, thus indicating that trapping operations of this type are of practical value for the protection of oyster beds.

It is clearly evident that the drill is a serious oyster pest, of such economic importance as to justify the immediate adoption and extensive application of control measures of the type outlined by the present investigation.

Two species of oyster drills occur in this region, namely *Urosalpinx cinerea* and *Eupleura caudata*, the former being considerably more numerous and destructive to oysters, comprising over 78 percent of the number collected. Prolific reproduction of *Urosalpinx* was observed in the heavy deposition of egg cases during June and July and the more or less continuous spawning of this species over a period of 7½ months. Egg cases of *Eupleura* were found in only three instances in numerous examinations of natural and planted beds.

Studies of the distribution, abundance, and possible control of oyster pests in the principal beds in Pamlico, Core, and Bogue Sounds and their tributaries in North Carolina were conducted in cooperation with the North Carolina Department of Conservation. In Core and Bogue Sounds where the salinity is high, ranging from 27.16 to 35.61 parts per mille, the destruction of 14 to 68 percent of spat and seed oysters by drills and 60 to 90 percent of adult oysters by boring sponge, was observed on beds located below low water mark. Drills were found to be most abundant on public beds in the vicinity of Harbor Island and Atlantic where 13 to 22 specimens were collected per bushel sample. By means of trapping operations a total of 10,755 drills were removed from these areas over an average fishing period of 4 weeks. In one locality an unusual catch of 3,238 drills was made with 100 traps in 1 week, of which approximately 94 percent were young specimens measuring from 3 to 14 millimeters in length. This particular area had been restocked the previous year with culled seed oysters from drill infested beds near Portsmouth, thus demonstrating how transportation of egg cases of this pest may cause its spread to other beds.

Field investigations were conducted from June 15 to October 15 along the western shore of the Chesapeake Bay in cooperation with the Virginia Commission of Fisheries. Observations at 245 stations showed the drill to be abundant throughout this region. An average of 9 drills and 35 egg capsules were found per bushel of oysters. Drills were most numerous in lower portions of the bay and rivers

where the salinity ranged from 19.05 to 24.25 and were absent in salinities lower than 15 parts per mille. A total of 1,527 drills were collected, 70 percent of which were alive, the others having been killed by the freshets of the previous winter. Eighty-three percent of the total were *Urosalpinx cinerea;* and 17 percent, *Eupleura caudata.*

In South Carolina, in cooperation with the State Board of Fisheries, a general survey of oyster pests in the coastal region from the Santee River to the Savannah River was conducted for the Bureau by G. Robert Lunz, Jr., of the Charleston, S. C., Museum. Samples of oysters collected at 132 representative stations show that the boring sponge and drill are the principal enemies of economic importance in this section. Over 41 percent of all oysters collected were infested with the boring sponge, particularly the more common species, *Cliona celata*, which at many stations showed prolific growth and honeycombed the shell of from 80 to 100 percent of the oysters. Serious shell injury by this pest is limited almost entirely to beds lying below low tide level in the more saline areas near the inlets, where oysters on both natural and planted beds rarely survive for more than 2 years because of sponge attack.

Damage by drills is limited for the most part to spat and small seed oysters occurring chiefly in a zone extending from 1 foot above low water mark to the bottom of the bed. Other pests found occasionally are the starfish, conch, and borer, none of which were found to be causing serious damage during the present survey, In several localities a heavy growth of common anthozoan coral, *Gorgonia*, was found on beds below low tide level where it apparently causes indirect injury and smothering of oysters by reducing the circulation of water and increasing the deposition of mud and sand.

During the period from September 15 to November 15 a general survey of the oyster pests on the Georgia coast was conducted in cooperation with the State department of game and fish. Observations made at 141 stations extending from the Savannah River to the St. Mary's River, show an abundance of drills on the natural beds, and an extensive and severe infestation of oysters by the boring sponge. Studies of drill distribution in relation to salinity show their presence at salinities from 10.4 to 30.6, the maximum abundance occurring in salinities from 24.3 to 27.7, or an average of 18 drills per sample. The boring clam, *Martesia*, was found to be a pest in this region, infesting the shells of 24 percent of the specimens examined, but in no case was it so abundant as to cause serious weakening or injury to the shell. Specimens of the borer, *Purpura*, and the conch, *Busycon*, were collected at 27 stations in salinities ranging from 17.6 to 30.4, but were not sufficiently numerous or destructive to oysters as greatly to reduce their production in this region.

Studies of the parasitic microorganism found in oysters in Louisiana, Virginia, and North Carolina were continued at the Beaufort laboratory by Dr. H. F. Prytherch. An improved technique was developed whereby rapid examination of the fresh tissues of spat and adult oysters could be made to determine the degree of infection by this protozoan, and the various stages in its life history. Examinations of over 750 spat collected during the period from March to December, show that the heaviest infection of the oyster tissues oc-

curs during the summer and fall months, and is followed by rapid reproduction and spore formation in the body of the host. Although the parasite has not yet been identified, its position as a member of the class Sporozoa has been confirmed by Dr. R. R. Kudo of the University of Illinois.

*South Atlantic and Gulf section.*—Oyster-pest investigations were undertaken on the Gulf coast, covering the inshore waters of Florida, Alabama, and Texas. Previous surveys and reports from members of the fishing industry showed that the most destructive pests in this section are the borer, *Thais*, and the leech, or wafer, *Stylochus*. Other pests associated with these, but whose relationships as commensals or enemies are undetermined, are the boring sponge, *Cliona;* boring clam, *Martesia*, and barnacles and mussels. The most serious damage was reported from Apalachicola Bay, Fla., and it was therefore decided to make this area the headquarters for the Gulf investigations. Separate surveys were made in Texas and Alabama.

Owing to the unavailability of sea water in Apalachicola, it was finally decided to establish the laboratory at Indian Pass about 20 miles away, where electric power could be obtained and communication with Apalachicola was possible by road. The construction of the laboratory was begun on May 20. The site was furnished gratis by its owners, the Lagoon Co., and the materials were supplied by the State department of conservation through the cooperation of Commissioner G. W. Davis. By July the building was ready for occupancy. It is of frame construction, consisting of a main laboratory and six smaller rooms, and a basement for pumps, storage, garage, etc. In August the salt water pump was installed and by September the laboratory was supplied with running sea water. The floating equipment of the laboratory comprises a large and a small skiff, and a cabin cruiser with accommodations for four persons.

Before the completion of the laboratory, field work was undertaken by R. O. Smith and G. Gunter on the study of the borer problem. Traps of aluminum insect screen, baited with large and small oysters and mussels, were set on oyster bars. This type of trap caught *Thais* on barren bottoms where no other food was available, but was inefficient where oysters were plentiful. Traps made of copper wire proved toxic to both oysters and mussels used for bait.

Chicken-wire cages were made to carry out field experiments on the rate of feeding of *Thais* and destructiveness of this gastropod in various salinities. The cages were placed on 6 different bars with normal salinities ranging from less than 10 to over 30. Unfortunately freshets brought all salinities down to less than 10 for a long enough period to kill all *Thais*, the experiment resulting, therefore, only in the proof that oysters can withstand a lower salinity over a longer period than can the borer.

Laboratory experiments have shown that *Thais* suddenly subjected to a drop in salinity of from 25 or above to below 10, survive about 2 weeks. However, if the change is gradual the borer will live several weeks without food even though the salinity be reduced to below 5. In any case, both field and laboratory observations show that *Thais* can live very well in salinities between 15 and 25 parts per mille.

In contrast to such borers as *Urosalpinx* and *Eupleura*, *Thais* rarely bores a hole, and has never been found to do so in the thick

part of a shell. Its mode of gaining entrance to an oyster is to cover the bill with its foot and under cover of this. rasp away the thin edge of the upper valve until a very narrow aperture is made. At present it is thought that a narcotic secretion is poured into the shell resulting in the narcosis and relaxation of the adductor muscle of the oyster. The presence of a large amount of purplish colored mucus found in attacked oysters along the frontal edge of the gills and the lack of mechanical means of holding the shell open during feeding seem to substantiate the observations, although further study of the problem is necessary. A *Thais* can kill and eat an oyster within 12 hours. In view of the relative ease and rapidity with which large oysters may be opened it is evident that the thickness of the shell is not a factor in the selection of food. Therefore, as shown by experiments in the field, trapping cannot be carried out successfully with baited traps.

Studies along this northwest coast of Florida show that, if 1935 was a normal year, spawning of *Thais* extends from late May to the early part of August, during which time temperatures are above 20° C. and salinities are over 20. There is a definite spawning migration, and egg laying is usually done by groups of individuals assembled in one place. Whenever possible capsules are deposited in masses on objects well elevated above the bottom. Each of these masses has been found to contain from 3,600 to 6,000 eggs. Development proceeds in the capsules for at least 7 to possibly 14 days.

The average size of the adults, both male and female, is 8 cm. Attempts to follow the rate of growth have so far been unsuccessful. Every area, from fresh water flats at the head of the bay to 5 fathoms out in the Gulf, was searched for young forms a number of times but out of several thousand specimens collected, less than half a dozen were under 5 cm in total length. It has been thought that last season was for some reason unfavorable for the survival of young *Thais*.

Beside the study of the distribution and habits of the borer, the field work in this section also included cruises for collecting hydrographic data for the practical purpose of obtaining a better understanding of the relationship existing between oysters, their enemies, and the various environmental factors involved. Hydrographic observations were confined to the oyster-producing areas of Apalachicola Bay, totaling about 130 square miles.

Although the laboratory is located in the pass between the Gulf and St. Vincent Sound there is a large difference between the maximum and minimum salinities even during the dry summer months. This wide range in salinities has a practical bearing on the oyster industry, for extreme changes from salt to fresh, or vice versa, render oysters unsuitable for the market. Oystermen frequently find it necessary to transfer operations from one locality to another in an attempt to locate oysters of marketable quality. It is believed that this situation might be greatly improved by setting aside suitable bottoms for the production of market oysters, while other beds would be used chiefly for seed production.

Examination of the oyster bars in this region has shown that the destruction of the large productive beds in St. George Sound has thrown an added strain on bars in other localities. The majority

of the bars supplying the market are badly overfished, the supply of cultch is inadequate, and unless additional bars can be brought into production, the present rate of fishing on producing bars will result in a steady decline in the size and quality of the shell stock.

*Life history of the leech.*—A study of the two species of polyclad worms or so-called leeches, *Stylochus inimicus* and *Eustylochus*, associated with the oysters of this region, and at times so abundant as to do damage, was carried out by Dr. A. S. Pearse and G. Wharton. *Stylochus* has been found at Bull's Bay in Charlotte County, Tampa, Crystal River, Port Inglis, Cedar Key, Apalachicola Bay, Port St. Joe, and Crooked Island Sound. It is more common in summer than in winter. *Eustylochus* is being described as a new species, having a wide range along the Atlantic and Gulf coasts, and found in all of the localities just mentioned in Florida. This species is apparently more common in winter than in summer along the Florida coast.

The anatomy of both species of oyster "leeches" has been studied in some detail. The largest specimens of *Stylochus* collected measused 48 by 28 mm, while those of *Eustylochus* measured 22 by 9 mm.

*Stylochus* is remarkably fecund. A single individual kept in sea water in a finger bowl in the laboratory laid 22,370 eggs. The leeches found in oyster shells in Apalachicola Bay were found to be brooding clutches of eggs numbering as many as 18,028. For development, a *Stylochus* egg requires from 9 to 15 days at summer temperatures, and hatches into a ciliated larva similar to those characteristic of leptoplanid polyclads. After a time it tends to creep about on solid objects, and when adult entirely ceases to swim. Eggs of this form were still being found on oyster bars as late as January 11.

Neither *Stylochus* nor *Eustylochus* have been observed to eat any food other than the bodies of oysters, though the latter is believed also to eat barnacles. Observations show that they bite holes in the oyster's body, usually attacking the gills first. An oyster invaded by a leech usually secretes a partition along its edge to shut out the intruder and sometimes succeeds in covering it over so as to incorporate it in the shell. An oyster occupied by a worm opens and closes its shell more often than under normal conditions.

Studies of the distribution of polyclads on the oyster beds in Apalachicola Bay at times showed more than 200 polyclads in a bushel of oysters. In general, *Stylochus* was most abundant where oyster bars were nearest the open sea; while *Eustylochus* was most abundant where mussels and barnacles are found; viz, close to shore or in inclosed lagoons. Polyclads such as these show considerable toleration to variations in environment, perhaps owing in part to mucus secreted abundantly when unfavorably stimulated. Low salinities undoubtedly cause their death. Eggs will not develop, and adults commonly do not lay eggs in salinities below 15 parts per mille and larvae have been killed in salinities as low as 13.9. When subjected gradually to progressively lower dilutions, the adults will live in a salinity as low as 6 parts per mille, *Eustylochus* enduring lower salinities than *Stylochus*. *Stylochus* endures considerable desiccation, reviving when immersed in sea water after a loss of 54 percent of its body weight.

*Stylochus* can survive in water which contains little oxygen. The effects of 23 chemicals on *Stylochus* in sea water were studied in an attempt to discover some substance which might kill the polyclads on oyster beds, but none of these has given promise of success. The larvae were less resistant than adults, but such high concentrations of poison were required to kill either that there seems little hope of controlling these pests by chemical means.

*Texas.*—During the summer of 1935 the oyster bottoms of the Texas coast were surveyed to discover the kinds and numbers of oyster pests present, and wherever possible to devise methods and make recommendations for their control. This investigation was carried out by Dr. Henry Federighi and A. Collier, with the cooperation of the Texas Game, Fish and Oyster Commission, who supplied the boat *Vivian*, which was converted into a laboratory and houseboat, and also the patrol boat *Eugene* and other floating equipment stationed along the Texas coast.

The survey, begun at Corpus Christi Bay and completed at Galveston Bay, followed very closely the Bureau's previous surveys in 1926 and 1931. Approximately 800 miles were covered during July and August, examinations being made of commercial reefs to determine the condition of the oysters, the salinity, temperature, character of the bottom, and the kinds and numbers of oyster pests present.

The most common oyster enemy in Texas, distributed from the Corpus Christi to Galveston Bays, is the common boring clam, *Martesia caribaca*, whose habit is to get a hold in an oyster shell and use it as a protective covering. In many cases it was found that a single oyster may harbor several hundred boring clams within its shell. Although it is probable this infestation has some effect on the growth and fattening of the oyster, it is impossible at present to state exactly what the effect is. Little is known concerning the life history of this pest.

Other pests found during the survey were the borer, *Thais haemastoma*, which does considerable damage in Louisiana and Florida; the common conch, *Fulgur perversa*, whose method of attack on oysters is still incompletely known; the boring sponge, *Cliona* sp., found only infrequently on the Texas coast, and probably of little significance; and the mussel, *Mytilus* sp., scattered here and there along the coast, and varying greatly not only from year to year but from season to season.

It was found that the tremendous destruction of the oyster beds in this section was due to the extraordinary increase in fresh water flowing from the flooded rivers of the Coastal Plain during May and June. In some areas there was a lack of live oysters due to the influx of the fresh water and its persistence over a period of time. In the northeastern part of Matagorda Bay, in past years the best source of oysters on the Texas coast, oysters have either been killed by the fresh water or covered with mud from the Colorado River, carried down into the bay since the removal of the dam.

### INVESTIGATIONS ON OYSTER CULTURE

*Long Island Sound.*—Because of increased activities in connection with the oyster pest control investigations, the regular studies on oyster culture were greatly curtailed. A study of seasonal varia-

tions in the metal content of the oyster meats and its relation to environmental changes was carried out in Long Island Sound by Dr. P. A. Galtsoff and Charles Weber. Over 100 composite samples of oyster meats collected in previous years at the experimental oyster farm at Milford, Conn., were analyzed for copper, iron, zinc, and manganese. The results of the chemical analysis reveal interesting facts regarding the fluctuations of these metals in oysters taken from one locality. It has been found that copper is subject to wide and irregular fluctuations while the iron content remains almost constant. The manganese shows steady increase during the period of gonad development, and an immediate drop after spawning. More detailed studies showed that manganese is accumulated by the ovaries but not by the testes or other tissues. All the oysters were very rich in zinc, the content of which fluctuated between 5,500 and 13,700 milligrams of metal per kilo of dry meat.

*Alabama.*—At the invitation of Commissioner I. T. Quinn, chairman of the Alabama Oyster Commission, Dr. Galtsoff made a preliminary survey in November of the oyster beds in Mobile and Perdido Bays to determine the best areas in which to initiate a W. P. A. development program of the oyster reefs in Alabama. As a result of this survey James B. Engle was sent to Alabama in December by the Bureau to make a more detailed study of oyster cultural problems in Mobile Bay with the view of assisting the State in reviving the oyster industry.

The reefs north of Cedar Point were found to have only a sparse growth of seed oyster available for rehabilitation, being on the whole badly depleted, partly as a result, perhaps, of illegal dredging. As an alternate area for seed supply Dauphin Island was suggested, since in this region there are many small oysters in clumps which would break up during handling. In Bon Secour Bay the reefs were also found to be badly in need of reshelling, the shells found being pitted and disintegrating from age and decay. It was suggested that shucking houses use their discarded shells for this purpose.

In the shoals lying between Cedar Point and Little Dauphin Island, an area of 6,000,000 square yards of densely covered bottom, the oysters appeared to be overcrowded. Thus between 50,000 and 75,000 barrels of seed could be obtained from this area at present to the benefit of the beds.

A survey of conditions on reefs of western Mobile Bay showed a good quantity of seed in small clusters and singles, which could profitably be moved from this section to a bottom where there is less chance of spring freshets destroying the young stock.

In connection with these surveys an investigation was undertaken to determine the effect on oyster bottoms of opening channels into Dauphin Island Bay, now almost landlocked. It was concluded that resulting changes in salinity would probably not be seriously detrimental to marketable oysters, unless conditions throughout Mobile Bay and Mississippi Sound are bad. In any event, as a result of the exchange of waters and the consequent augmented supply of food organisms, oysters growing in those deepened regions should be superior in quality. They should also be benefited by the protection against adverse temperature which deep water affords.

## OYSTER INVESTIGATIONS IN WASHINGTON STATE

Most of the work carried on at the Puget Sound Laboratory by Dr. A. E. Hopkins has been a continuation of the plan of study on the problems concerning the Olympia oyster, *Ostrea lurida*, and is inseparable from the general results obtained and recorded since the investigation was undertaken in 1931. The purpose of this investigation was to make a study of the factors influencing spawning and setting of the Olympia oyster in order to develop a system whereby oyster growers could be assured annually of an abundant supply of seed. Therefore, studies were made of spawning habits, larval life, and the attachment of the larvae.

Thermograph records of water temperatures taken continuously over a period of 5 seasons indicate that 13° and 14° C, the average temperatures of the water in which Olympia oysters begin to spawn in the spring, may not be called the critical temperature for some spawning takes place above and below this temperature range.

It has been found that after their discharge from the maternal brood chamber the larvae swim freely for a period of from 29 to 41 days, depending upon water temperature.

The relative number of spat caught daily per unit of cultch was obtained for each of the past 5 summers as follows: Wire baskets containing shells were planted throughout each season, allowed to remain in the water for a few days, and the collected spat counted. It has been found consistently that the setting of larvae occurs in well-defined periods directly correlated with tidal cycles. Typically setting is heaviest during a run of extreme minus tides. Experiments show that most of the larvae attach upon the flood tide, few at the ebb tide during this period. Very little setting occurs during neap tides. Thus, within certain limits, the waves of setting are predictable merely from the tide tables. On the basis of such results, oyster growers were advised as to the time to plant cultch for the collection of seed, and it is generally agreed that the industry has benefited materially by this assistance during the past several years.

Continued study of the effect of changes in salinity on the rate of feeding of the Japanese oyster have further shown these quantities to be directly correlated. When the salinity falls below approximately 13, the oyster appears to be unable to pump water. Above this level, within limits, the rate of pumping increases directly with salinity. These experiments provide the much-needed information about the effect salinity may have on transplanted oysters.

A study was begun on the spawning and setting habits of the Japanese oyster, which has recently become established on the Pacific coast. While the temperature of the waters in this State is in general somewhat too low for successful natural propagation of this species, it is evident that scientific investigations may show it possible for growers to produce their own seed instead of importing it from the Orient. In the summer of 1935 an investigation was begun to lay the foundation for a more extensive study of this problem during the next few years.

A matter requiring immediate attention is the Japanese oyster drill which, unfortunately, has been introduced into several waters in the State of Washington, and in one locality has done tremendous

damage. This pest is not subject to control measures effective in other sections of the country because of its different biological reactions. Even in the middle of December when the water temperature averaged 10° to 12° C, egg cases of this species were found containing all stages of developing young from early embryos to small snails ready to escape. A detailed study of this drill is essential not only for the benefit of the Japanese oyster, but also for the protection of the native oyster of the Pacific coast.

### YORK RIVER POLLUTION INVESTIGATION

In October 1935, under a special allotment of $20,000 received from the P. W. A., the Bureau began investigations at York River, Va., to determine what effect, if any, the pulp mill wastes discharged at West Point, Va., have on the oysters of this region. Local oystermen reported that the oysters were in poor condition, that many were stunted and discolored, with shells so thin they could almost be crushed in the hand. Formerly the York River oysters were noted for their superior quality and especially prized in the New York market. Dr. N. A. Wells was in charge of the field work, assisted by Dr. W. A. Chipman, A. D. Hasler, and L. Garriss.

This investigation has consisted mainly in field and laboratory studies on the effects of various concentrations of pollutants on the survival of oysters, their physiology, rate of feeding, and on the accumulation of glycogen in their tissues under various environmental conditions.

A building was leased in Yorktown, Va., and converted into a laboratory with a running sea-water system. Labor as well as considerable construction material was provided by the Fort Eustis Transient Camp under the direction of Paul B. Murphy. The Virginia Commission of Fisheries cooperated in the project making available the *Marguerite*, a 65–foot Diesel powered boat.

After the first week in October field stations were established, water and oyster samples being collected at stated intervals for chemical analysis. Up to the end of the year, eight cruises have been made on the York River, and three on the Piankatank River, which was selected for control observations.

Due to the efforts of Mr. Richard Armstrong, Commissioner of Fisheries of Virginia, the State appropriated $500 to defray the expense of planting experimental beds of oysters in the York and Piankatank Rivers during the Bureau's pollution studies. Between November and early January, seven beds were planted in the York River and two in the Piankatank. Samples of oysters were taken at regular intervals from these beds and analyzed as to glycogen content, shell weight, shell liquor, etc. Water samples were taken at the same time for chemical analysis.

Observations thus far show that living oysters in the upper part of the York River, near the pulp mill, have shells that are extremely thin and soft. Since this poor condition indicates that something may be interfering with the normal metabolism of the oyster, experiments are being planned to study calcium metabolism. It is of interest to note here that this abnormal shell condition has not been observed to exist in any other river emptying into the Chesapeake Bay, or in the bay proper.

Examination of tissues in oysters from the upper part of the river show them to be more flaccid and transparent than those from the lower part; they have less meat and less shell per unit of total weight, have a higher water content, and lower glycogen content.

In order to obtain a satisfactory solution of the pollution problem in the York River it will be necessary to have a complete picture of physical, chemical, and biological conditions in the river at the present time, and as much of an historical background as possible.

For information concerning the past history of the oyster industry in York River, the investigators are dependent upon the willingness of oyster planters to state the changes, if any, in their yield of oysters before and since the establishment of the pulp mill. Since they have agreed to cooperate in this, it is hoped that these invaluable data will be available.

In connection with the York River pollution investigation experiments were conducted in the Washington laboratory to determine the effect of the pollutant from the York River on the rate of propagation of diatoms which comprise the food of oysters. Other experiments are being carried out to determine the effect of various mineral salts on the propagation of diatoms. Numerous experiments along this line are under way.

### BIOLOGY OF THE QUAHOG (*Venus mercenaria*)

An investigation of the life cycle of the quahog clam was carried on by V. L. Loosanoff at Milford, Conn., where specially constructed tidal tanks permitted the physiological observations under conditions very closely approaching those of the natural environment. During the year, observations were made on the gonad development of the clam and its feeding activity.

Young clams, when only 0.6–0.7 cm long, collected on the clam beds of Long Island Sound near Milford, Conn., in October, were found to possess distinctly bisexual gonads with very strong male predominance. In the majority of cases fully ripe spermatozoa occupied the central part of the lumens, while small oöcytes and oögonia constitute the inner walls of the follicles.

In the middle of the summer, when the water temperature reaches the critical point, the ripe spermatozoa are discharged. Soon afterward two distinct types of individuals become distinguishable as definite males and females. In the males a second period of spermatogenesis begins in the autumn and continues at a reduced rate throughout the winter. In the spring, with the increase of water temperature, rapid branching of gonad follicles takes place simultaneously with increased rate of spermatogenesis. The gonads then have the typical male character of the adult. Spawning follows later in the summer, when the size of the shell has reached a length of 3 cm or more.

In those individuals destined to become females the lumens of the follicles remain empty after the spermatozoa are discharged. At the end of the initial male phase the gonad follicles remain distended with only a thin layer of undifferentiated cells and small oöcytes along the inner walls. In many cases numerous phagocytes invade the follicles and devour the degenerated male cells. Oögenesis begins in the early spring. In June and July the follicles

contain mature ova. The animals, formerly functioning as males, have now reached the stage of functional females.

The adults are, with few exceptions, of separate sexes. Among several hundred mature clams studied by means of serial sections only two cases of functional hermaphroditism have been observed. Nevertheless, examination of gonads of adult males reveals in almost every instance the presence of small oöcytes somewhere along the walls of the follicles. This may indicate the potentiality of changing the sex even in the adult condition, but so far there has been no evidence obtained to warrant such a conclusion.

Spermaries of adult males contain mature spermatozoa at all seasons of the year. When placed in sea water spermatozoa begin to swim actively in their typical spiral way after 2 to 3 minutes of quiescence. This simple experiment was tried at biweekly intervals throughout the year and always with positive results. The ovaries of adult females also contain large ova at all seasons of the year. In fact, little difference will be noted on superficial examination of samples collected in December and June. In both cases the follicles are large, distended, and filled with large oöcytes. In this respect the quahog differs remarkably from the American oyster, in which only shrunken follicles are found during the autumn and winter.

To study the effect of water temperature on the feeding of quahogs experimental animals were kept under natural conditions in large tanks in which the water was renewed with every tide. Each clam was immobolized by imbedding one of its valves in a mixture of cement and sand, and connected to the lever of a recording apparatus placed about 10 feet above. Each movement of the shell was recorded on the chart, and the temperature of the water was at the same time recorded by a thermograph. The clams were kept attached to the recording apparatus for varying periods of time ranging from 1 to 10 days. Usually the records of two clams were taken simultaneously. During these experiments the water temperature in the tanks varied from 0.0° to 28.0° C., thus covering the entire natural range of temperatures to which clams are subjected.

The hibernation of clams occurs when the water temperature is 4.9° C. or lower. Prolonged periods of opening of the shells and presumably active feeding and respiration proceeds at temperatures of 6.0° C. and above. This knowledge of the effect of temperature on the shell activities of the clam may add to a better understanding of several practical problems of the clam industry. Undoubtedly growth and fattening of clams, as well as development of sexual products, are dependent upon the length of time the shells are open because feeding can take place only during that time.

## INVESTIGATIONS ON AQUICULTURE

H. S. Davis, *in charge*

Investigations on problems relating to aquiculture were continued along much the same lines as in 1934. Greater emphasis, however, was placed on field studies since it was believed that it will be impossible to utilize the products of our hatcheries to best advantage until we learn more about the various factors that affect fish in

natural waters. Our lack of information on these fundamental facts is the greatest obstacle with which we now have to contend in developing a scientific policy of fish management. Opportunities for field investigations by the Bureau of Fisheries have been greatly extended through a recent cooperative agreement with the United States Forest Service, which provides that waters in the national forests may be utilized by the Bureau for experimental purposes.

### POND-FISH CULTURE

Owing to lack of funds for construction of ponds at the Leetown station, investigations in pond-fish culture during 1935 were again limited to experiments conducted by O. Lloyd Meehean at the Natchitoches (La.) station. These studies were a continuation of those begun in 1934 which were designed to determine the relative value of different fertilizers in pond culture. Although the ponds fertilized with cottonseed meal had produced, on the average, more food than those in which other fertilizers were used, the results of the 1934 experiments were not conclusive. For this reason a different method was adopted in 1935. Instead of keeping the amount of fertilizer per unit area constant, and varying its composition in each pond as was done the previous year, the quantity of fertilizer was varied, the composition kept constant, and the length of the fertilizer period extended. In all cases cottonseed meal was used as a fertilizer.

It was found that the average weight of bottom organisms was greatest in ponds that received the smaller amounts of fertilizer. The data indicate that under conditions at Natchitoches a weekly application of about 25 pounds of cottonseed meal per acre is sufficient to maintain fertility.

It was found that in general an increase in the production of bottom organisms resulted in a corresponding increase in the production of bass up to about 105 pounds of fish per acre. After this point was reached further increase in bottom organisms had little effect on the production of fish.

Carbon and nitrogen determinations were made of the plants found in the ponds. These studies showed that the ponds produced from 3.86 to 6.81 tons (dry weight) per acre of vegetation. Furthermore, the equivalent of 189 to 282 pounds of nitrogen is tied up in the vegetation in an acre of water during the season, in other words, as much nitrogen as is found in 1.39 to 2.08 tons of 36 percent cottonseed meal. These results indicate the extent of the loss in food elements when large amounts of vegetation are removed from a pond as is the common practice in pond culture.

### TROUT CULTURE

*Feeding experiments.*—Feeding experiments at the Pittsford, Vt., station during 1935 were confined to tests of a new food, sold under the trade name of "Egg-Glo", which has been highly recommended as a trout food by a number of fish culturists. It was found that on a diet of 30 percent "Egg-Glo" and 70 percent beef liver, rainbow fingerlings made a considerably slower growth than a fish on either a diet of 30 percent salmon egg meal and 70 percent beef liver, or a

straight diet of beef liver. The mortality, however, was low and practically the same as in the lot fed beef liver only. The results with yearling rainbow trout were practically the same as with fingerlings.

In order to compare the value of seal meal and salmon-egg meal in the diet of trout, two lots of rainbow fingerlings, at the Leetown, W. Va., station were kept on experimental diets from September 23 to December 18. One lot was fed a ration composed of 60 percent beef liver and 40 percent seal meal while for the other lot salmon-egg meal was substituted for seal meal. At the end of the experiment the lot fed the seal-meal combination had gained 380.78 percent in weight while the lot fed the salmon egg meal combination had gained only 274.09 percent. The mortality was 10.2 percent and 16 percent respectively.

*Selective breeding.*—Breeding experiments designed to develop superior strains of trout were continued along the same lines as in previous years. Eggs from 48 selected pairs of brook trout were incubated at the Pittsford, Vt., station and as usual the best lots of fingerlings will be segregated until they mature. An exceptionally high percentage of these eggs hatched and, since they were taken from a stock of fish producing highly fertile eggs, it is a reasonable tentative assumption that this high fertility is a result of selection.

In the breeding experiments at the Leetown, W. Va., station eggs were taken from 38 pairs of selected brook trout, a part of which were select stock of the second generation. In an effort to obtain a strain of brook trout which will produce eggs better adapted to conditions at Leetown, stock is being selected at present on the basis of high fertility rather than of rapid growth, body symmetry or other characters. The present standard requirement for a select stock is a minimum of 70 percent reaching the eyed stage, an exceptionally high figure for brook-trout eggs at Leetown, the average being approximately 43 percent.

Breeding experiments have also been carried on with rainbow trout and with brown trout.

*Nutrition studies.*—Nutrition studies have been continued at the Cortland, N. Y., hatchery by Dr. C. M. McCay and A. V. Tunison. Three lines of research have been followed during the year: (1) Continuation of the study on growth of four species of trout fed similar diets, and maintained under similar conditions; (2) the determination of the amount of feed that should be fed per unit of weight to attain the most economical production; and (3) biochemical studies to determine the optimum amount of phosphorus and calcium needed by a growing trout. The four species used were: Lake trout (*Cristivomer namaycush*), brown trout (*Salmo fario*), rainbow trout (*Salmo irideus*), and brook trout (*Salvelinus fontinalis*).

The experiment to determine the relative ability of the species to convert feedstuffs into body tissues was continued through the 128th week. All four species were maintained under similar conditions and fed the same diet, consisting of two parts fresh beef liver and one part dry skim milk. The numbers were reduced from time to time to eliminate the factor of overcrowding. It was found that lake trout was the most efficient of the four species in the conversion

of feedstuffs into live body weight under the conditions of this experiment, while the brown trout seemed to be least efficient.

Two lots of brook trout were fed separate diets in the experiments to determine the most satisfactory amount of feed that will produce the most economical gain in weight. One diet consisted of equal parts, by weight, of beef liver and trimmed beef hearts; while the other contained in addition to these meats dried skim milk, cottonseed meal, and whitefish meal. The results of these experiments show clearly that (1) within certain ranges, the efficiency of feed utilization is inversely proportional to the quantity fed; (2) the utilization of dry feeds is much less efficient than that of raw meats, although the dry feeds are more economical in cost; and (3) young fry probably need 10 percent of their body weight in feed while older trout, up to a length of 3 inches, need only about 5 percent. Hatchery feed bills can be greatly reduced if a more effective method of using dry feedstuffs can be discovered.

Experiments were conducted to determine the amounts of calcium and phosphorus in the trout body, and the source of these mineral elements. There is good evidence to show that trout absorb calcium from the water even as early as the egg stage. In the egg and the sac fry stages phosphorus was found to be 6 to 8 times more abundant than calcium. But during the subsequent period of rapid growth, the calcium content of the body increases rapidly until finally in older fish it tends to exceed the phosphorus content.

*Field investigations.*—To test the common belief that rainbow trout will not long remain in the smaller streams in which they have been planted (at least in eastern streams), experimental plants of yearling rainbow trout were made in the fall of 1933 and also in 1934 under the direction of R. F. Lord. These plants were made in the South Branch of Cold River, a small mountain stream with an average volume of 10 to 12 cubic feet per second.

An attempt was then made to keep account of the number of fish caught, by the following procedure: Anglers were provided with blank forms on which they were requested to state the number of fish they caught, as well as certain other information. These they were asked to deposit in mail boxes set up for the purpose conveniently near common parking places. The mail boxes were painted a brilliant red to attract attention, and advertised by conspicuous signs which were posted along the stream calling attention to the fact that the Bureau of Fisheries was attempting to secure data on the number of fish taken annually from the stream as a guide for future stocking.

As recorded in a previous report, the results for a similar experiment in 1934 were unsatisfactory, only 87 fish being reported out of 700 fish planted the previous fall. This was a return of approximately 12 percent, but it is probable that only a small proportion of the anglers reported, and that the actual total catch of planted fish was much greater than that figure.

In the fall of 1934, 1,000 yearling rainbows were planted in the same stream. These fish were marked by removing the right pelvic fin to distinguish them from the fish planted a year previously, which had the left pelvic fin removed. The fish were well distributed along the stream, every effort being made to avoid too great a concentration in any area.

During the first month of the open season a fair degree of cooperation was obtained from anglers, 66 reports being left in the mail boxes. In June, however, only one report was filed, although it is known that fish were still being taken. A total of 290 fish were reported for the season, 11 of these being fish that had been planted in 1933.

Furnace Brook in Rutland County was the only stream operated as a test stream in 1935. It is a clear-water stream, more or less rocky, with a bottom that remains fairly stable. The test area was approximately 4 miles in length, and commenced just above a falls that stops practically all upstream movement of fish. The stream averages about 25 feet wide and is subject to heavy fishing throughout its length. Both brook and rainbow trout are established in the stream, but only brook trout have been planted in this area in recent years. It was stocked in September 1934 with 2,400 legal-size trout.

During the fishing season, May 1 to August 14, 1935, inclusive, 1,197 angling reports were secured. These show that the season's catch consisted of 8,589 legal trout, of which 5,647, or 66 percent, were brook trout and 2,942, or 34 percent, were rainbow trout. The average number of fish per fishing effort was 7.2.[7]

The outstanding fact revealed by this study is the tremendous amount of angling being done by today's fishermen; and it is evident that under such conditions good fishing can be maintained only by continual management. So valuable has this study proved itself that plans have been perfected to set aside four test streams during the 1936 fishing season.

*Studies on Big Spring Creek, Va.*—A study of the production of rainbow trout in relation to the number of fish planted and the abundance of natural food was continued under the direction of E. W. Surber in a 1-mile section, comprising approximately 1.65 acres of water area, of Big Spring Creek, near Leesburg, Va. During the season, 124 trout of legal size were taken with hook and line. The total weight of these fish was 57.47 pounds, a yield of 34.83 pounds per acre. This result compares favorably with those obtained in 1933 and 1934 when yields of 29.7 and 27.66 pounds per acre, respectively, were obtained.

Bottom samples were taken at monthly intervals, and the wet and dry weights of the organisms determined after they had been counted and identified. The average wet weight of bottom organisms for the year ending September 9, 1935, was 6.695 grams per square foot. The average dry weight of these samples was 1.321 grams. This is a material increase over the previous year, when there was an average wet weight of 5.047 grams and an average dry weight of 0.982 grams per square foot.

A total of 1,080 fingerling rainbow trout were planted in the fall of 1934 in Big Spring Creek. These fish were marked by removing the right ventral fin so that they could be distinguished from those produced by natural propagation. Sixty-five fish thus marked were recaptured—a return of 6.02 percent of the fish planted. While it

[7] "Fishing effort is the fishing done by 1 man during the course of 1 day, regardless of how long a period or how many times he fishes during the day.

thus appears that only a small percentage of the fish planted reached legal size, the results are much better than in the previous year, when only nine marked fish were recaptured.

### COOPERATIVE WORK IN NATIONAL FORESTS

Under the terms of a cooperative agreement recently completed with the United States Forest Service the Bureau of Fisheries assumes responsibility for conducting research necessary for the development of a comprehensive program of fish management for waters of the national forests.

Owing to lack of funds the Bureau was unable to continue stream surveys in the national forests during the summer of 1935, and its activities in connection with stream improvement were confined to exercising technical supervision over the work carried on in this field by the Forest Service.

During the latter part of May a short field course for training men to plan and direct stream-improvement work was conducted by the Bureau and the Forest Service in the Pisgah National Forest, N. C. Early in June a similar training school was conducted in the Cache National Forest, Utah. At the close of these training courses the men were employed by the Forest Service to take charge of stream-improvement work in national forests throughout the country.

The stream-improvement work carried on during the last 2 years has been largely experimental, the ultimate aim being to determine to what extent this work can be relied upon to improve angling conditions. The results indicate that in streams notably lacking in pools and shelter much can be done to provide better living conditions for fish. In some cases it has been possible to provide additional spawning beds and to improve those already present, thus permitting a considerable increase in natural propagation.

In the average mountain stream dams in one form or another have been found to be more valuable on the whole than any other type of structure. Since such streams are often deficient in pools and are subject to the scouring action of frequent floods, structures are needed that will tend to retard erosion rather than accelerate it. Deflectors have also been used to advantage, but usually have proved most valuable when used in connection with dams to improve circulation in pools and to prevent deposits of silt and sand.

A considerable part of the stream-improvement work has consisted of the removal of obstructions of various kinds that interfered with the movements of fish. Other work has been the planting of trees, shrubs, and other vegetation to furnish shade and beautify the banks. It is evident that in many instances reforestation will do more to improve stream conditions than all other methods combined.

In view of the urgent need for further information on the value of stream improvements and on other means of improving fishing conditions in the national forests, arrangements were made for a number of experimental projects in this field. These projects, which are being carried on in cooperation with the Forest Service, and in some cases with State conservation agencies, are designed to throw more light on the more important factors concerned in fish management.

The most extensive project of this kind has been planned for the Pisgah Division of the Pisgah National Forest. This forest affords an exceptionally favorable opportunity for investigations of this nature, since it contains many excellent trout streams which are under the complete control of the Forest Service. It is proposed to use these streams for a demonstration of scientific stream management as a means of improving angling conditions. A rearing station is being constructed on the headwaters of the Davidson River, where fish required for stocking can be reared to the required size.

A similar arrangement was completed for the use of certain streams in the Big Levels Game Management Area in the George Washington National Forest. Work on these streams was started in August 1935.

*California trout investigations.*—Excellent progress has been made on the cooperative program, organized in 1932, with the California Division of Fish and Game. No radical changes were made this year in the field program, which consists of work along two major lines of effort: The Hot Creek brood-stock experiments and the coastal-stream steelhead studies. Dr. P. R. Needham is in general charge of the field program and in direct charge of the Hot Creek project, while A. C. Taft has supervision of the coastal-stream steelhead project. Two assistants, Leo Shapovalov and Leo Erkkila, are supplied by the State Division of Fish and Game.

Lack of funds prevented continuance of stream and lake surveys on the scale begun in 1934 with P. W. A. funds. However, brief biological surveys were made by staff members on Salton Sea, Bucks Lake, Lake Merced, and Lake Arrowhead, in California.

Studies on the steelhead of the coastal streams have continued and additional work has been undertaken on the Klamath River.

At Scott and Waddell Creeks, in Santa Cruz County, a census of the run is made each year in order to determine the basic facts in the life history of the steelhead and silver salmon, such as age, growth, migration, and the return from given escapements. At Scott Creek during the 1934–35 season the run was somewhat larger than during the previous 2 years and totaled 585 fish. Nearly 45 percent of the fish were grilse, and, judging from the number of marked fish among them, they were largely from the planting of the previous year. On February 12, 5,608 fish which had been reared at the hatchery ponds during the previous summer were released below the dam. Losses were very heavy in the ponds, due to an outbreak of furunculosis. Although this epidemic, if continued, may seriously hamper the work, the survivors are being marked and planted in an effort to determine if they and their progeny will show an increased resistance to the disease.

Judging from the number of silver salmon and steelhead trout taken at the Waddell weir during the two seasons in which it has been operated, the run of adult fish was somewhat greater during the past season. The number of steelhead migrants, however, was smaller, perhaps owing to the loss of adult fish from furunculosis during 1933–34. The downstream movement of cottoids was repeated at the same season as in 1933–34, but the run was greatly reduced in size.

On the Klamath River marked steelhead have been planted in Fall Creek and Beaver Creek, two moderate-sized tributaries of the upper river. During May 1935 an additional lot of 29,000 fish were marked

by the removal of both ventral fins and planted in the West Fork of Beaver Creek. This planting of marked fish was made with the dual purpose in view of comparing the more detailed findings made at Waddell Creek with the somewhat different conditions found on the Klamath, and of establishing an annual run of marked fish which would give some indication of the varying intensity of fishing in the main stream below.

In May the ponds at the Hot Creek station were drawn down and the survivors of the select lots of fingerlings that had been planted in the previous July and August were netted out, graded, and the best retained for brood-stock purposes. An average survival rate of 23.36 percent obtained after a period of approximately 9 months in the four natural ponds used. A total of 27,300 pedigreed trout weighing 717 pounds were planted in nearby waters from the Hot Creek ponds this year.

The number of select brood stock held for experimental breeding purposes now total 1,597 fish, representing five different strains of rainbow. The majority of these fish will reach spawning age in the fall and winter of 1936–37, when actual selective breeding tests will be started.

Remarkable growth rates have obtained in spring water at Hot Creek at 63° F. On natural foods, starting with fish between 2 and 3 inches long, growth averaged approximately half an inch per month. In a feeding experiment 100 rainbow averaging 5 inches in length were fed a diet of 30 percent liver (fresh weight), 35 percent salmon egg meal, and 35 percent abalone chips. Under the regime, growth averaged approximately 1 inch a month. Another lot of the same size and kind of fish held under identical conditions, but fed only pure shrimp collected from watercress beds grew on the average 0.82 inch per months. The experiments with both lots of fish were run for a period of 85 days. It required 3 pounds of the liver—salmon egg meal—abalone chips diet to produce a pound of trout at a cost of $0.28 per pound of trout raised. The cost of this diet was $0.084 per pound. It required 9.57 pounds of shrimp (wet weight) to produce a pound of trout in the shrimp fed lot.

Excellent returns were obtained from the Angora Lake planting experiment this year, 136 catches, yielding 809 trout, being recorded. Marked fish of the 1933 and 1935 plants combined formed 77 percent of the 809 caught in 1935. Only 23 percent of the catch were unmarked trout. No marked trout were caught prior to the 1935 fishing season. The average catch per angler in 1934 was 2.3 fish and in 1935, 5.9 fish.

A plant of 2,014 marked rainbow trout averaging 5.67 inches in length was made in Convict Lake on July 20, 1935. The object of this plant was the same as those made in Angora Lake; viz, to compare numbers actually taken by anglers with numbers planted. Another object was to test a new system of boat records from which the catch per unit of effort from year to year could be determined.

The results obtained are most promising. The catch per unit of effort [8] was determined as 0.21 fish per hour per angler. Boat fishermen filled out 106 catch-record blanks. Only 50 percent of the parties renting boats actually caught fish. For those taking trout

[8] Here "catch per unit of effort" is not the same as "catch per fishing effort" defined on p. 440.

the average catch per boat was 3.6 fish. The average length of the rental period was slightly over 4 hours. Of the 2,014 marked rainbows, 349 or 17 percent of the total plant were caught. By using the proportion of marked to unmarked rainbows caught, it is possible to estimate roughly the total rainbow population of Convict Lake. Catches of shore fishermen were likewise recorded; and trout caught both by this group of fishermen and persons fishing from boats totaled 848 fish. Of this number 25 percent were loch leven, 33 percent unmarked rainbow, and 41 percent marked rainbow of the 1935 plant. Approximately 76 percent of all fish taken were caught by shore fishermen while 24 percent were taken from boats. Boat fishermen caught larger fish hence more pounds than shore fishermen obtained, but they caught fewer fish. By determining the catch per unit of effort annually a definite measure of the trend of the fishery in the lake will be obtained. Thus, the effects of any system of management, stocking, or restrictions put into effect by fish and game authorities can be ascertained.

### FISH DISEASES

As in previous years, the study of fish diseases was largely confined to investigations of epidemics at hatcheries and the development of better methods of control. The establishment of a pathological laboratory at Seattle, Wash., in charge of Dr. Frederic F. Fish has made it possible to devote more attention than formerly to disease problems in the intermountain region and the Pacific Coast States.

The major investigations of the West Coast Pathology Laboratory during the past year have been directed towards a reduction in the toll of salmon and trout taken by diseases in the hatcheries. As the presence or absence of disease largely determines the advantage of artificial over natural propagation, the work of this laboratory has been directed chiefly toward preventing diseases rather than attempting to develop new methods for treating them after they have appeared. The prophylaxis of fish diseases represents a practically unknown field, and many preliminary problems had to be satisfactorily solved before a suitable technique could be evolved. The method chosen for experimental disease prevention work was the routine application of a constant and weak concentration of a disinfectant to the running water supply of a hatchery trough for a uniform period of 1 hour at weekly intervals. This method, commonly known as "prolonged dipping", was favored because it involves a minimum amount of labor for its application, and does not necessitate the handling of the fish in any way. Consequently it solves the disease-control problem for the one-man hatchery.

Although it has been definitely demonstrated that at least certain parasitic diseases of trout may be prevented by routine prophylaxis, disease-prevention work is still in the experimental stage. The losses attending prophylaxis are materially lower than those occasioned by therapeutics. Attempts to cure epidemics of parasitic protozoa have invariably involved considerable losses of fish even though the treatments were carefully administered at the first indication of trouble. The disinfectants available for disease-prevention work are

many, and present efforts are directed towards the determination of the maximum concentration of each practicable disinfectant tolerated by trout, and the minimum disinfecting concentration effective against each type of pathogenic organism. The eventual goal of the disease prevention investigations is the development of a technique involving the use of some disinfectant, or combination of disinfectants, which may be applied under ordinary hatchery conditions with a minimum of effort and which will prevent the appearance of most, if not all, diseases of hatchery trout and salmon.

Another research project of this laboratory concerns the epidemiology of fish diseases—likewise a new field of endeavor. Through the generous cooperation of the Division of Fish Culture, daily loss records are kept on individual lots of fish by all hatcherymen in the intermountain and Pacific coast regions. An accurate loss record is thus available for every lot of fish from the time they are brought to a hatchery until they are finally liberated. Over a period of time, an analysis of these records should not only yield reliable information concerning the efficiency of individual hatcheries, but should likewise demonstrate many of the factors responsible for losses, and the exact effect of efforts to correct these factors. Such information should prove of great value in raising the efficiency of the entire system of artificial propagation of trout and salmon.

During the year, studies were undertaken on the relative sterilizing power of the various disinfectants commonly used at hatcheries. For such studies, a modified phenol coefficient technique was employed and a strain of *Bacterium salmonicida* was chosen as the test organism. It was indicated that any concentration of these disinfectants capable of killing *B. salmonicida* during an exposure of 1 hour was likewise fatal to fish life in the same period of time. A concentrated solution of calcium hypochlorite proved to be the most satisfactory disinfectant for sterilizing ponds not containing fish and for nets, dippers, and other hatchery utensils.

The more basic pathological studies on individual diseases of fish were continued during the year. A previously unrecognized type of gill disease, of similar pathology but different etiology than the bacterial gill disease common to eastern United States, was found affecting both trout and salmon at several western hatcheries. This disease was apparently of bacterial origin, and although several organisms were isolated in pure culture from infected gill tissue, suitable opportunity for experimental infections has not yet been available. Until such experiments are accomplished it is impossible to state which one, if any, of the cultivated organisms is responsible for the disease. This western variety of gill disease has failed to respond favorably to any known form of treatment. Apparently by the time the presence of this disease is realized, the host is so weakened through extensive tissue alteration that it is unable to withstand the additional rigors of treatment.

In addition to the definite long-term projects summarized above, numerous field trips have been made to assist the hatchery men with their disease problems.

A new disease known as "white mouth", affecting tropical fish in the Southern States, was found to be due to infection with *Bacillus*

*columnaris*. This organism, known to cause serious losses among bass, crappie, sunfish, etc., when they are handled in warm weather, has not previously been reported among aquarium fish. It affects tropical fish chiefly during shipment. Evidently as the result of injuries caused by bumping against the sides of the can, the lower jaw becomes infected, the infection advancing along the floor of the mouth until it reaches the gills. This bacterial growth forms a white felt-like mat from which the disease derives its name. The disease can be easily controlled in early stages by treatment with a dilute solution of copper sulphate or other disinfectant.

It is now evident that an attempt to eradicate furunculosis at the Leetown (W. Va.) experimental hatchery has been entirely successful. During the summer of 1934 several lots of brown and brook trout yearlings developed the disease. Immediately all fish in the infected lots were destroyed and the pools disinfected with chlorine gas. Inasmuch as no signs of furunculosis have appeared at this station since that time it is evident that the disease was completely eradicated. This case is of special interest since it demonstrates that, if taken in time before it has become established, furunculosis can be stamped out at a hatchery without a significant loss of fish.

The investigation into the causes of "blue-sac" were continued at the Leetown station by E. W. Surber. It was suggested that the trouble might be due to the high free carbon dioxide content of the hatchery water supply (about 44 parts per million). Accordingly a series of experiments was conducted to investigate the relation between the acid-base equilibrium and the health of trout. It was found that:

1. Raising the free carbon dioxide content of the water to 60.7—62.1 parts per million resulted in a decreased hatch, and an increase in the number of deformed fish.

2. Brook trout eggs in soft water can develop normally in relatively high concentrations of free carbon dioxide (39 p. p. m. at Ogletown, Pa., 42.03 p. p. m. at Lewistown, Md.).

3. Blue-sac was not nearly so evident in water neutralized with sodium hydroxide, but since the general effect of this chemical was otherwise so deleterious there appears to be no advantage in its use.

4. The addition of sufficient caustic soda to neutralize most of the free carbon dioxide in the water is injurious to brook trout eggs, reducing the hatched fry to about 28 percent or less of the original number.

5. Brook trout eggs are more sensitive to the chemical changes brought about by the addition of caustic soda than are rainbow eggs, which in earlier experiments were either unaffected or benefited by its addition.

The functions of the Disease Service were greatly expanded during the year, and a large number of specimens submitted by Federal, State, and commercial hatchery men were examined and diagnosed at both the Washington and Seattle laboratories. Although in most cases the service is limited to the examination and diagnosis of preserved material, it has been of great assistance in enabling fish culturists to adopt proper control measures before epidemics were so far advanced as to render such measures ineffective.

## FISHERY INVESTIGATIONS IN INTERIOR WATERS

M. M. Ellis, *in charge*

### POLLUTION STUDIES

The growing menace of pollution in the fresh waters of the United States by erosion, and by municipal and industrial wastes has been accepted fatalistically by many as inevitable because the basic facts, chemical, physical, and biological, concerning stream pollution generally have not been available. The menace is spreading not only throughout the various river systems but into the impounded waters as well, and threatens at various points the waters of the public domain and of the national playgrounds. Consequently remedial and corrective measures compatible with the interests of fisheries and with economic necessities have not been easy to define.

To meet this situation the Columbia (Mo.) field unit of the United States Bureau of Fisheries has been conducting for some time investigations to ascertain: (1) The natural conditions favorable for fish and other aquatic life in unpolluted waters, so that a polluted stream can be defined with fairness to all concerned; (2) the specific effects on fish and other aquatic life, and on the aquatic environment itself, of the various types of effluents which are being turned into the fresh waters of the United States.

Much effort has been given to devising suitable tests for the determination of the extent of stream pollution that could be applied practically in the field.

A set of water standards has been defined, based upon the results of thousands of tests and analyses made in all of the major river systems of the United States. The common variables in stream water; namely, dissolved gases, salts, turbidity, and ammonia are defined with reference to the limits constituting a suitable environment in which desirable fish can thrive. These standards provide a background for the study of stream pollution regardless of its source or extent.

Detailed biochemical, physiological, and pharmacological studies of over 40 types of effluents have been made, from which the specific effects of these effluents on fish and other aquatic life, as well as the reactions of these effluents with the stream water itself have been determined. From these studies it has been possible to make definite recommendations for practical remedial measures in various cases of stream pollution. As this work is continued more such applications can be made.

Mobile units, housed in autotrucks, have been perfected for the field study of stream pollution. These field laboratories make it possible to cover large distances rapidly, and to obtain at the source of pollution data supplementing the experimental tests conducted at the central laboratory at Columbia, Mo., and at the branch laboratories for trout studies at Bozeman, Mont., and for long-time tests on warm-water fishes at Fort Worth, Tex.

During the past year, in addition to the general work outlined above, specific pollution investigations have been made in Maine, Pennsylvania, West Virginia, Tennessee, South Carolina, Virginia, Montana, Idaho, Arizona, New Mexico, Texas, Oklahoma, and in the Mississippi Valley, through cooperation with the War Department,

the Department of the Interior, the Tennessee Valley Authority, various State organizations, and several industrial concerns.

The future work of this unit calls for advancing as rapidly as possible the detailed studies of the effluents themselves, as only through an understanding of the actions of these effluents on fish and other aquatic life can remedial measures be expected. Besides, new types of effluents are constantly appearing as new industrial developments are made.

The surveys of particular streams having specific pollution problems are to be furthered as rapidly as funds permit, as the work of this unit has by no means covered all of the types of existing stream pollution.

### MUSSEL PROPAGATION

During the past year the long-time experiments on growing fresh-water mussels in restricted areas have been continued at Fort Worth, Tex. These experiments, which will tell their complete story only after several years of actual test under practical conditions such as are being maintained at Fort Worth, continue to give promising returns. It is interesting in this connection to note that similar efforts are being made with some success to raise oysters in crates and confined areas off the bottom in silt-laden water, utilizing methods similar to those employed at Fort Worth with fresh-water mussels.

## INDEPENDENT ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORIES

### WOODS HOLE, MASS.

Owing to lack of funds, the Woods Hole laboratory was not maintained on an operating basis in 1935. Although facilities were utilized in connection with the oyster investigations reported upon elsewhere, no independent activities were possible.

This condition not only retards progress in the Bureau's fishery investigations, but also loses to the Bureau the advantage formerly gained from results obtained by independent investigators through use of the laboratory's facilities. Correction of this condition is urgent.

### BEAUFORT, N. C.

Facilities for the study of marine-fishery problems of the South Atlantic region were provided throughout the year by the Beaufort laboratory under the direction of Dr. H. F. Prytherch. The chief investigations conducted here by the Bureau's staff, as reported in detail elsewhere, consisted of experiments and studies with reference to (1) the biology and control of the oyster drill, (2) the distribution and abundance of oyster pests in the coastal waters of Virginia, North Carolina, South Carolina, and Georgia, (3) a protozoan parasite of the oyster, (4) an improved method of handling oyster meats, (5) the development of the ovaries of the commercial shrimp, and (6) food of the commercial shrimp.

The laboratory serves as headquarters for oyster investigations in the South Atlantic and Gulf States, and has cooperated with the conservation departments of Virginia, North Carolina, South

Carolina, Georgia, Florida, and Mississippi in planning and directing extensive operations for the rehabilitation of public oyster beds in the respective States with funds provided by the Federal Emergency Relief Administration and Works Progress Administration. In North Carolina assistance was given to the N. C. E. R. A., and the conservation department in technological, statistical, and administrative matters pertaining to the formation of a cooperative fishermen's organization which began operation in October 1935.

Laboratory facilities for marine research have been provided for eight independent investigators from other institutions who were engaged in the following studies: Prof. H. V. Wilson, University of North Carolina, experimental-histological studies on the cellular structure of sponges; J. W. Culbertson, under supervision of Professor Wilson, on the breeding times of sponges; J. S. Denby, Brevard College, study of marine fauna and the ecology of a typical sand shoal; J. H. Pratt, Jr., Harvard Medical School, disposal of industrial and domestic trade wastes at Beaufort, N. C., and vicinity in relation to municipal supply and sea-food industries; Prof. Hoyt S. Hopkins, New York University, effect of reducing agents on oxidation of tissue in mollusks; Dr. F. G. Walton-Smith, Commonwealth Fund Fellowship, England, physiology of oyster larvae; Dr. Hugh S. Darby, Columbia University, development of the fiddler crab; R. S. Collie, North Carolina State Museum, collection and preparation of marine animals for exhibition.

*Terrapin culture.*—The propagation of diamond-back terrapin was continued at the Beaufort laboratory in cooperation with the Division of Fish Culture and yielded, in 1935, a total hatch of 13,245 young terrapin, which is the greatest annual production obtained in these operations. The highest previous record was that obtained during the preceeding year when a brood of 12,446 was produced in the five separate breeding pens. During August and September the newly hatched terrapin were collected from the protected egg beds and transferred to the large rearing house where they were given special care and feeding in order to get them in good condition before hibernation. During the winter months, or hibernating period, the young have been kept in a newly constructed outdoor pen located in one of the large terrapin pounds on the north side of the laboratory. The hibernating pen, having a length of 56 feet and a width of 10 feet was constructed with concrete walls and close fitting, movable wood covers so as to insure complete protection of the young against damage by rats and mice as occurred during the previous season. The distribution of the 1935 brood will be made during the spring of 1936 throughout the South Atlantic coastal waters in cooperation with the various State conservation departments.

## ICHTHYOLOGICAL INVESTIGATIONS

*Investigations in Panama.*—Upon the request of Dr. Herbert C. Clark, director of the Gorgas Memorial Laboratory, Panama City, cooperative investigations with that laboratory were made in Panama. Dr. Samuel F. Hildebrand was detailed for the work by this Bureau. Largely because of the splendid cooperation offered by Dr. Clark and various Panama Canal officers, a comparatively

large area was covered and a large amount of work accomplished in the short time from January 26 to March 11.

Dr. Clark particularly desired to obtain an identified series of the more common local species of fishes for the laboratory collection, principally for use in determining the species from which parasites are obtained for study from time to time by the staff helminthologist, Dr. Aurel O. Foster. As many species as possible were collected and later identified in Washington. Representatives of 97 more or less common species have been sent to the Gorgas Memorial Laboratory. Many more species were obtained which require further study for exact determination. In the laboratory in Washington Dr. Hildebrand was assisted by Louella E. Cable.

The time chosen for the investigation was particularly auspicious because the Gatun Locks were dewatered, giving the investigators not only an opportunity to "gather" fish on the bottom, but also to see and study the fauna present in the locks. The two species of fish present in great abundance in the two lower levels of the locks were the "blue jack", *Caranx hippos*, and the "bony fish", *Elops saurus*. Other species present in these levels of the locks were the tarpon, several species of snappers, a few groupers, and a considerable variety of less common and smaller fish and minnows. The upper chamber of the locks, in which the water is quite fresh at all times, contained only a few large tarpons, a few marine mojarras, *Gerres plumieri*, a few anchovies, and several small fresh-water fishes.

It is often asked whether the locks are a passageway for fish. It is understood, of course, that strictly marine fishes, even though they should succeed in passing through the locks could not endure the fresh water of Lake Gatun. However, there are some species that are able to pass from salt to fresh water and vice versa without evil effects. Among these is the tarpon, now a regular inhabitant of Lake Gatun. It also occurs in Miraflores Lake, which it could reach only by passing through Culebra Cut and the locks at Pedro Miguel. A special effort was made to determine whether this fish breeds in one of these fresh-water lakes or adjacent arms and streams. However, no evidence indicating that breeding is taking place in fresh water was secured. It seems probable, therefore, that the locks are used as a passageway by the tarpon, and very probably by a few other species.

Upon the request of Col O. G. Brown, chief health officer of the Panama Canal, inspections were made of a large area of Gatun Lake, where a very profuse growth of Chara occurs, which at low water stages, as during the dry season, forms a very bothersome breeding area for mosquitoes. The situation, however, did not seem to be one that would lend itself to control by the use of fish.

Collections also were made at the Pearl Islands where local sportsmen maintain a fishing club, and where very excellent sport fishing is to be had. Small shore fishes were extremely scarce at the time the collections were made but a short distance offshore fishes were abundant and several species that apparently are new were obtained by trolling. Much more work is required to determine all the species secured there.

It was possible, also through the generosity of Dr. Clark and others to fly to the Rio Chiriqui Viejo near the Costa Rican border in southwestern Panama, to investigate the results of a plant of rainbow trout made by the Bureau of Fisheries in the upper stretches of this stream in 1925. It was found that the trout were abundant as had been reported by sportsmen. The temperature of the water during the several days spent on the stream in February at an elevation of about 6,000 feet varied from 54° F. in the morning to 57° F. in the late afternoon. Based on 45 digestive tracts examined, about 90 percent of the food injested by the trout consisted of caddisfly larvae and nymphs. The remaining food included beetle larvae and a few adults, mayfly larvae and nymphs, dragonfly larvae and nymphs, stonefly larvae and nymphs, net-veined midge larvae, a few midgefly larvae, a few adult terrestrial insects, and very few ostracods and amphipods.

### MARINE FISHES OF THE GULF COAST

Systematic studies of the American fishes in general, and those of the Gulf coast in particular were continued by Isaac Ginsburg. Special attention was given to the revision of genera of the difficult families Pleuronectidae, Gobiidae, and Cyprinodontidae. These revisional studies should place the systematics of some of the more difficult marine families on a firm scientific foundation.

### SILVER SPRINGS, FLA.

During the latter part of August, Dr. Samuel F. Hildebrand spent several days collecting fish in Silver Springs, Fla. Because of the clearness of the water it was found impracticable to collect with a seine during the day, as the fish were able to see the net and the collectors, and invariably retreated to a safe distance or depth. Consequently most of the collecting was done at night.

Altogether 25 species of fishes were obtained in Silver Springs. They consist of 2 species of gars, the bowfin, 2 species of catfish, the common fresh-water eel, a jack-pike or pickerel, the white mullet (a marine fish), 5 species of sunfish, the large-mouth black bass, and 11 species of minnows belonging to 5 different families. The collection, of course, is not exhaustive, but it very probably includes nearly all the regular residents.

Fishing is prohibited in the springs and large fish are fairly numerous, it being possible to see the entire population even to a depth as great as 50 or 60 feet, because of the clearness of the water. Small fish and minnows, however, are rather scarce. Evidently the springs have as large a population of predatory fishes, such as the bass, bowfin, catfish, gars, jack-pike, and sunfishes as can find sufficient food.

*Lake Mattamuskeet.*—Upon the request of the North Carolina Conservation Commission, Dr. Samuel F. Hildebrand was detailed to make an investigation of Lake Mattamuskeet to supplement another investigation made earlier in the year by other representatives of the Bureau (Messrs. Jackson, James, and Surver). The principal purpose of the investigation was to determine the comparative

abundance of large-mouth bass, and the status of the supply of food present for these fish. It had been alleged that the lake, which at one time was drained and then reflooded during recent years, was overpopulated, and that some of the fish should be removed.

It was found that although bass were numerous, food, such as minnows, young fish, and crustaceans, was scarce. It was found, furthermore, that the bass were mostly in an emaciated condition and were heavily parasitized, principally with the copepod of the genus *Lernaeocera*. Although adults were numerous, there were practically no young bass, indicating cannibalism. It was recommended that, although adult bass were numerous, the fish be left in the lake, partly because they were parasitized and partly because virtually no young bass were present. Under the circumstances, it seemed clear that with the limited amount of sport fishing permitted, the population would soon be reduced naturally until a "biological balance" would be reached, as has happened in other recently flooded areas previously observed by the investigator.

### EASTERN TEXAS SURVEY

Dr. Hildebrand identified a collection of fish for R. T. Richey of College Station, Tex. The specimens were collected in eastern Texas, in connection with a survey made by Mr. Richey for the Game, Fish and Oyster Commission of Texas. The identifications are to be used in a report on the survey.

### OTHER COLLECTIONS

In connection with the study of pollution of inland waters, Dr. M. M. Ellis made collections of 452 specimens of small and young fishes. The specimens were taken in many different sections of the United States, from Maine to South Carolina and from Montana to New Mexico. Dr. Hildebrand, assisted by Louella E. Cable, identified 69 species in the collections.

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